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NATIONAL WATER INFORMATION SYSTEM ADMINISTRATOR'S MANUAL

Chapter 3. Automated Data Processing System (ADAPS)
Version 3_1

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ABSTRACT

The U.S. Geological Survey's Water Resources Division is developing a National Water Information System (NWIS), which is a distributed water data-processing system using UNIX workstations and file servers. One subsystem or component of NWIS is the Automated Data Processing System (ADAPS).

The ADAPS Administrator's Manual is the principal reference document for operation and maintenance of ADAPS at locations (District offices) that use ADAPS to process and store water data.

1   INTRODUCTION

This section is an introduction to the ADAPS Administrator's Manual. It presents a brief background of computerized processing, purpose for the manual, an acknowledgment of personnel who contributed significantly to the development and implementation of the system, and a list of selected references.

1.1 Background

The methods and techniques used by the Water Resources Division of the U.S. Geological Survey for automated data processing of water data via electronic digital computer were first developed in the early 1970's. The earliest comprehensive user's guide (manual) on automated data-processing procedures, using a Bureau mainframe computer and nation-wide terminals connected to the central computer using telephone lines, was published in 1975 by the Geological Survey as Open-File Report 75-426, "WATSTORE User's Guide", compiled by N.E. Hutchison and others. Subsequent open-file guides followed, and these guides were used extensively by the water-data community throughout the United States for the storage and retrieval of water data.

The need for updating the computerized water data-processing system became obvious as a result of hardware and software advancements and alternative management practices. Futhermore, it was felt that the scope of the system should be expanded to cover not only the newer developments and techniques, but also the management and processing mode required to store, retrieve, and archive large amounts of water data. In recognition of those needs, the Water Resources Division embarked upon a program to place a minicomputer and associated peripheral equipment (terminals, printers, tape readers, etc.) in most District (State) offices. These minicomputers were connected to a central Bureau mainframe computer and to one another via a telecommunications network. This linkage of computers forms a Distributed Information System (DIS) whereby files are transferred among District offices (nodes) within the network, and work is done at distant locations. One goal was that individual users could process water data in an interactive environment at each District office. An initial interactive system, developed by the New Jersey District, was distributed and implemented nationwide early in 1984. This system did not provide a full capability of water data processing; therefore, a more comprehensive development effort was undertaken. This later effort entailed a complete system redesign with more management and user oversight. The present computerized system has been rewritten to run on UNIX and NT platforms.

The Automated Data Processing System (ADAPS) is part of a National Water Information System (NWIS). Other data-processing systems that are part of NWIS are the Quality of Water (QW) System, the Ground-Water Site Inventory (GWSI) System, the State Water-Use Data System (SWUDS), and the Site File System.

1.2 Purpose of the Manual

The purpose of this Administrator's Manual is to serve as a reference document for operation and maintenance of ADAPS. The tasks and functions covered in the manual are usually accomplished or performed only by the local District ADAPS administrator and/or another designated person.

1.3 Acknowledgments

The material presented in this manual is based on the work of many hydrologists and computer programmer/system analysts. However, special acknowledgment is given to a group of personnel who have made major contributions in the form of complex software development and testing, documentation preparation and revision, training, and all-out efforts to bring about the nationwide implementation of the system. These personnel include:

> George R. Dempster, Jr.
> Shelby E. Dreyer
> Mark L. Farmer
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> Gary D. Rogers

Acknowledgment is also made of the guidance and suggestions offered by other colleagues who served on review and oversight committees.

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2   GENERAL INFORMATION

This section presents a short summary about the Distributed Information System (DIS), the Automated Data Processing System (ADAPS), the ADAPS software and files, and the need for file maintenance.

2.1 Distributed Information System

The linkage of minicomputers in each District (State) office and the Bureau mainframe computer forms the basis for a Distributed Information System (Posson, 1985). The Distributed Information System (DIS) provides a high level of local computing and data-processing capability. Computerized files are transferred between sites (nodes) within the network and work is done at distant locations. The DIS provides interactive and batch processing in support of Water Resources Divisions's State and National water data files, and provides for the diverse computational needs of the Division. These needs include data management, hydrologic modeling and statistics, and administrative programs.

The DIS computers are connected to each other via a TCP/IP (Transmission Control Protocol/Internet Protocol) over an ethernet Local Area Network (LAN). The LANs are connected together using a frame-relay Wide Area Network (WAN) called DOINET. The WAN uses Stratacom switches and Cisco routers for the network service backbone.

2.2 Automated Data Processing System

The Automated Data Processing System (ADAPS) consists of a collection of computer programs (software) and data files that form a system of standardized water data-processing procedures. In each District, there is a designated administrator or manager who is responsible for installation and maintenance of system programs and hydrologic data files. In addition, the administrator performs other tasks that are necessary for efficient operation of the system.

Most of the data needed by ADAPS programs are supplied interactively. However, some programs accept input from system files. Therefore, the programs require the pathname (data set name) of the input file. Occasionally the user is prompted to supply a pathname (either for input or output), but usually the name need not be known. Most pathnames are stored within a program or in a file containing pathnames, thereby relieving the user of having to keep track of the pathnames.

A security system is used in ADAPS to restrict access to the data files and to limit the ability of some users to perform certain operations in the system. The security system is a multilevel system. User classes of System Administrator (SYST), Data Base Administrator (ADBA), User (USER), and Cooperator (COOP) have been established. In addition, Ingres Access Control Lists (Seybold, 1985, p. 3-1 to 3-28) are used. Security measures are implemented by the local administrator or manager in consultation with District supervisory personnel.

Water data stored in ADAPS results from processing of data collected or recorded at field installations operated by each District. Data collection and processing is discussed in the ADAPS User's Manual. A vast majority of the field data is recorded in digital form on punched paper tapes or recorded by a data collection platform (DCP) and sent to the computer via satellite telemetry. The telemetry input subsystem is discussed later in this manual. The field data is processed by District personnel following established procedures. The data are reviewed for validity and correctness, and subsequently are published in State basic data reports.

The ADAPS programs and files operate in tandem to form the processing system. Programs and files are discussed in the next two sections.

2.2.1 Programs

The programs (software) for ADAPS are developed by personnel of the Water Resources Division. The master copy resides at Headquarters in Reston Virginia, and is electronically trans- ferred over the network or distributed by magnetic tape from Headquarters to each of the District offices. These offices are located nationwide and include Alaska, Hawaii, Guam, and Puerto Rico. Some Districts have more than one office, and a copy of the software is located at the subdistrict offices, if they have a minicomputer.

Most ADAPS programs are written using the Fortran77 programming language, and several different categories of software make up the water data-processing system. The major categories are:

- ❑ System utility programs.
- ❑ General-purpose programs.
- ❑ Command Procedure Language (CPL) programs.
- ❑ General application programs.
- ❑ General graphics programs.
- ❑ Vendor-supplied programs (subroutines).

The programs in each of the above categories is used for a specific function or purpose. For example, the utility programs are used to initialize, create, update, and maintain the numerous support, processing, and data (time-series) files that make up the District data bank. The general-purpose programs are used to process many different types of water data along with the subsidiary calculations and computations that go into computing and producing a water data record. Most programs use insert and common blocks (Prime Computer, Inc., 1983, p. 3-1 to 3-26) to share and communicate data between programs, to provide software flexibility, and to ease software maintenance. The operating system software is called UNIX(Seybold, 1985, p. 1-2). The Command Procedure Language (CPL) is a PRIMOS command level language that provides a programming capability (Landy, 1982). Operating system commands or directives are passed to PRIMOS for execution after they are stored in a CPL file (suffix .CPL). The application programs are used primarily to compute statistical information about the hydrologic data. The graphics pro-

grams are used for preliminary viewing of the data, for comparison purposes, and for report purposes. The system contains both user-written and vendor-supplied programs such as DISSPLA (Integrated Software Systems Corporation, 1984).

The Automated Data Processing System (ADAPS) programs are used to compute water-data records on an electronic computer. The machine operations generally parallel the manual operations. The sequence of processing the data is well established; however, the particulars of each step by electronic means may change in response to continued improvement in storage and access procedures, new or expanded needs, and search for additional efficiencies. The general functions of the programs are to provide input and output to and from the computer in a logical sequence; this sequence includes the computational steps necessary to efficiently compute water data records. Once the records are computed, they must be saved and archived for general use. Therefore, programs are available to provide for a broad scope of functionality including initialization, maintenance, security, backup, recovery, restart, and other overall data-processing requirements.

2.2.2 Files

The ADAPS files are the repositories that contain the information and data necessary to use ADAPS for computing and processing water data records as previously mentioned. The files consist of program source code and associated executable code, CPL files, and operational files. Some of these operational files are shared by the various NWIS systems and some are specific to ADAPS. The shared and ADAPS-specific files are briefly described in Section 3 of this manual.

Most files used and/or maintained by ADAPS are structured as MIDAS files and managed by a utility and user-written software. The MIDAS files allow records to be retrieved rapidly and efficiently on the basis of selected data elements defined as key indexes (elements). MIDASPLUS utilities, user-written programs, and scripts are used to create the file templates, create input files, and subsequently populate the files. Other utilities are used to dump the files, delete files, cleanup files, and monitor files.

Some information regarding the file creation was provided in informal instructions (Trapanese, S.M., U.S. Geological Survey, written commun., 1987) to install ADAPS on the local minicomputer and to convert existing minicomputer and mainframe data files for use in ADAPS. Additional information concerning initialization (creation) of files is presented later in this manual. ADAPS menu (program) options are selected to perform the various functions necessary to create new MIDASPLUS files.

Information is also presented later in the manual to perform incremental backups of the unit-values data files, and to restore the unit-values files using the incremental backups. The need for file maintenance is discussed in the next section.

2.2.3 Need for File Maintenance

In virtually every data-processing system, the possibility exists that errors may occur that accidently alter or destroy data stored on disks in data files. This may occur because of unexpected hardware failures, natural disasters such as power outages, etc., or through improper processing of the data.

It is essential, therefore, to provide a means to ensure that any lost data can be recovered. The most common method used is backup files. A backup file is merely a copy of a file stored on magnetic tape or disk. If the file is destroyed or becomes unusable, the backup can be used to re-create or restore the file. In transaction-oriented (online) systems, back-ups are critical because updates to a file can occur at any time. Therefore, the system should provide for creating backups on a regular basis (sometimes every hour or day) and saving the transactions that occur to the file after the backup file is made (incremental backups). If the file is lost, it can be re-created from the backup file and then the transac-tions which have been saved can be processed against the file to bring it back to the status it was before it was lost.

Another aspect in a transaction-oriented system is the ability to restart the system if it goes down. For example, if a transaction (update or modification) has been sent and has parti-ally updated a file when power is lost, it is necessary to both restore the file and let the user know that the transaction was not processed. This problem may be solved by using the backup files and messages sent to terminals asking the users to resend those transactions not processed. Backup and recovery (restart) of the system are described in later sections of the manual.

3   SHARED AND ADAPS-SPECIFIC FILES

This section presents an inventory of the files that are shared and used by the National Water Information System (NWIS) and ADAPS. These files are classified into groups named Support, Time-Series Related, Processing, and Output.

3.1 Introduction

All NWIS files are stored in a tree-like structure of directories under */usr/opt/nwis*. Within the */usr/opt/nwis* directory, there are various files necessary to:

1. provide support information about users, data collection sites (stations), instruments, data descriptors, Agency, State, County, etc.,

2. compute and process water data collected as a time series or that are related to the time series,

3. provide user processing information, and

4. provide output files created as a result of an analysis or retrieval, or as a result of a particular processing operation.

The locations of these data files on disk are not fixed. The local administrator or manager can relocate them in response to changed needs or for management of disk space. The files associated with each of the above areas are listed in the following sections of this manual. A general statement about what each file contains, and a commonly used abbreviation, if one exists, also is given.

The shared and ADAPS-specific files are also listed in the ADAPS User's Manual.

3.2 Support Files

The following files are used to provide support information about the system users and data collection sites. The files shared by all data-processing systems in NWIS are called common files. The other files are ADAPS specific.

3.2.1 Common Files

❑ Site - Contains fixed information about each data collection site such as latitude and longitude.

❑ Parameter/statistic codes - Contains numeric water data parameter and statistic codes.

❑ Agency codes - Contains alphanumeric agency codes.

❑ State and county codes - Contains numeric Federal Information Processing Standards (FIPS) codes for States and counties.

❑ Hydrologic units - Contains alphanumeric codes represent- ing geographic regions within river basins in the United States.

❑ Terminal - Contains information to define and support different terminal types.

❑ Gpath - Contains pathnames of various data files for all of the water data-processing systems.

❑ Global variable - Contains variables that are to be known by a group of programs rather than a single program. This file is an operating system command level file.

❑ Help - Contains user information pertaining to program prompts or questions, or contains descriptive information about a processing step or application.

3.2.2 ADAPS Files

❑ Node configuration - Contains local office name and network node name, satellite processing information, data base name, and plotter, printer, and paper tape reader information.

❑ User - Contains user information and file output pathnames, background information on user terminals and printers, and last site processed by the user.

❑ Instrument (IN) - Contains instrument type and recording information for each instrument channel (sensor).

❑ Data descriptor (DD) - Contains water data parameter and statistic code information for each sensor.

❑ Processor (PR) - Contains data output conversion information, such as form of primary output, processing threshold and base values, and auxiliary gage information.

❑ Group - Contains site identification and parameter code combinations used mainly for retrievals. The information is concatenated from several other files.

❑ Control - Contains information to control processing for running in batch mode.

❑ Security - Contains information to control access to individual stations (data collection sites). The station-level security provides the maximum protection, and it should not be confused with Access Control Lists (ACL's), which are also used.

❑ Documentation - Contains printable copy of this manual.

Within ADAPS, three of the above support files are key to defining and processing water data; they are the IN, DD, and PR files. For a station, the IN record defines the types of data sensing equipment installed at the site. This IN record points to one or more DD numbers (records) that are associated with it. The DD file holds the basic definition of a unique site record. More explicitly, a different DD number is assigned to each parameter (sensor data) at a given cross-section and depth location for a single station. Along with the agency code and station number, the DD number forms a full site identification. This site identification is used to locate data in other ADAPS files. Using a site's full identification, the PR record defines the processing scheme and parameters necessary to compute unit and daily values. These three key files are described in more detail in the ADAPS User's Manual.

3.3 Time-Series Related Files

The following ADAPS files are related to the processing of time-series collected data.

❑ Measurement/crest-stage gage (MS) - Contains discharge or other measurement data.

❑ Rating/conversion - Contains stage-discharge relation data or other tabular lookup data.

❑ Datum corrections (DC) - Contains data to correct changes in gage datum due to settlement or upheaval of the gage or to correct for an instrument being set incorrectly in the field.

❑ Shift by time (ST) - Contains data to apply the shifting control method of computing water-data records on basis of time.

❑ Variable shift (SV) - Contains data to apply the shifting control method of computing water-data records on basis of stage, or to make an adjustment to a value prior to or after a table lookup (rating). The variable-shift procedure is sometimes referred to as using a Vee (V) diagram.

❑ Unit values (UV) - Contains data collected more frequently than daily and at discreet (fixed) or varying time intervals.

❑ Daily values (DV) - Contains data observed on a daily or a continuous basis and numerically reduced usually on basis of unit values.

3.4 Processing Files

The following files are used to provide the user with processing information:

❑ Status - Contains synopsis of satellite processing information.

❑ Errors - Contains entries of encountered data-processing errors from satellite processing.

3.5 Output Files

The following files are used to provide the user with analytical or retrieved hydrologic data.

❑ Meta - Generic files that are created for subsequent use by other software systems such as graphics systems.

❑ Applications - Files that contain statistical or other types of information created by application programs, or that contain data furnished by retrieval programs. One proposed file is called the Application Programs Transfer File (APTRAF).

❑ Temporary - Files that are created as part of normal processing for use by subsequent operations or programs.

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4   ADAPS PROGRAMS AND SCRIPT FILES

This section discusses ADAPS programs run primarily by an ADAPS administrator and describes generated script files. These files contain the results of a terminal session when using ADAPS.

4.1 Programs

The ADAPS programs (and files) provide for accomplishing the varied and necessary tasks required to operate a nationwide computerized water data-processing system. The status of these programs is not static, and they change when operational needs change.

The following sections of the manual present information on the startup and query programs, and on the updating of support files, starting and stopping of satellite data, and maintenance of MIDASPLUS and Unit-Values files. All of these programs are used to accomplish the water data-processing work tasks. These tasks are selected via ADAPS main and submenus or by giving a program name. Discussions of the menus and programs are presented in subsequent sections of the manual; functionally related work tasks are grouped together in separate sections and subsections. Most programs use the startup routine (discussed briefly in Section 5, and more thoroughly in the ADAPS User's Manual) to display the common User File entries such as last-used agency code, site identifier, and instrument identifier. The entries displayed may vary, depending on which program is being run. Once a task is completed, a program can be exited or another task can be selected.

4.2 Script Files

Saving or documenting a terminal session is often useful. If errors arise or if information is entered (keyed) incorrectly, the session information can be reviewed and possible problems solved. In ADAPS, each user's terminal session can be saved in a script file, as described below.

Users can save or document a work session by using the UNIX script command (**script <filename>** before entering the command **adaps** at the terminal. This creates a file that captures all that happens during the work session, and the file can be printed.

This file is especially useful to the ADAPS Administrator if a problem develops while running ADAPS. In this situation, it is important to notify the Administrator and/or rename the script file before reentering ADAPS. This will save the script file containing the problem

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5 ADAPS STARTUP AND QUERY ROUTINES

All ADAPS programs use a common set of routines to provide an orderly and consistent method for startup of the system programs and for handling queries. This feature gives the programs a uniformity of processing. Every program initially calls the startup routine and then uses a common set of routines to handle the individual program-user queries. The startup routine performs several functions. When an ADAPS program is initially invoked, the startup routine queries the user for certain information that relates to the specific program to be run. Data obtained by this action must have been retained in a User File for that user. The startup operation also opens all of the needed files. If the ADAPS program is to run later using a batch postprocessor program (an option in some programs), the startup routine also creates the initial records for a Control File for use by the postprocessor program. Formats of the Control File records are described in Attachment A of the ADAPS User's Manual.

On subsequent entries into ADAPS, the startup routine retrieves and displays user choices from previous use of ADAPS. The user makes any desired changes and continues with the processing in the routine. The information displayed varies from program to program, depending upon the needs of the individual program. An example of a complete user information display from the startup routine is given below.

```
                         ADAPS TEST SITE
                      STARTUP TEST PROGRAM
DATE: 05-07-1986     USER JDOE                      TIME: 08:55:19
******************************************************************
CURRENT USER INFORMATION
PA - FILE PATH     - <PART>JDOE>NWIS
OT - OUTPUT TO     - OUTPUT TO A FILE
OT - BATCH OUTPUT  - OUTPUT TO A FILE
OF - OUTPUT FILE   - O.UV_TABLE.020.19880405.1323 <-- (See below)
OF - OUTPUT FILE   - OUTPUT TO USER-SUPPLIED FILE NAME
PL - PLOTS TO      - PLOTS TO A META FILE
PO - PLOT FILE     - PLOT.DEFAULT
TR - TAPE READER   - MITRON
-----------------------------------------------------------------
DB - DATA BASE     - ADAPS TEST DATA BASE
AG - AGENCY        - USGS   GEOLOGICAL SURVEY
ST - STATION(S)    - 12345678  TEST STATION
DA - DATA TYPE     - UNIT VALUES
DD - DATA DESCR    - INSTANTANEOUS GAGE HEIGHT IN FEET
IN - INSTRUMENT    - ADR #1 TEST FOR ADAPS
SC - STATISTIC     - 00003 MEAN
YR - PERIOD        - 1985 TO 1986 Water Years
DT - DATES         - 05-05-1986 TO 05-05-1986
BA - JOB MODE      - BATCH MODE USING QUEUE: NWIS
BQ - BATCH QUEUE   - NIGHT1
BF - ERROR FILE    - ERROR.DEFAULT
******************************************************************
Enter: PA,OT,OF,PL,PO,TR,DB,AG,ST,DA,DD,IN,SC,YR,DT,BA,BQ,BF to
       edit field or [CR] to continue:
```

A brief discussion of each of the options (two letters) and user information items given above is presented in the ADAPS User's Manual, and is not presented again in this manual. **Note**: For the OF option above, ADAPS automatically generates an output file name composed of a program identifier, user number, a date, and a time (see the ADAPS User's Manual for a complete description) if one is not given.

User interaction in ADAPS programs is handled by a set of query routines that use common commands. Since these commands are common to all queries, they are usually not repeated when the prompts are displayed. In addition to the answer to a prompt, most queries can be answered with the following partial or full word:

> For HELP: HE, HEL, or HELP.
> For OOPS: OO, OOP, or OOPS.
> For QUIT: QU, QUI, or QUIT.
> For EXIT: EX, EXI, or EXIT.

Each of these answers (the associated routine), and an additional command to execute a UNIX command from within an ADAPS program, are discussed in the ADAPS User's Manual and are not mentioned again in this manual.

6   NWIS/ADAPS SECURITY FEATURES

This section summarizes the NWIS access (security) system and discusses the implementation of the ADAPS menu security system. ADAPS is part of NWIS, therefore the system applies to ADAPS. The system is meant to help the Districts manage access to the NWIS system structure (directories and files). The system is flexible enough to handle each District's needs, and as a result is somewhat complex.

The NWIS access system is contained in the directory *usr/opt/nwis/data/auxdata*. The system is created by running two scripts. The first one creates the access categories (ACAT's). The second sets access for all common NWIS areas and files using the ACAT's created by the first script.

The access system functions to control data accessibility. This control can be tight or loose. Different people have different access to data via individual and/or group classifications. These classifications are based on whether the person is a data "reader," "writer," or both.

The ADAPS menu system (described in next section) access consists of files stored in the directory *usr/opt/nwis/data/auxdata*. The file *nwis.access.data* contains a list of user access codes (COOP, USER, ADBA and SYST. The hierarchy of access is COOP, which is the lowest level (i.e., least access to total number of programs and restricted principally to retrieval operations), and SYST, which is the highest access (i.e., can access all programs and perform all operations). Each ADAPS main menu functional category has its own file; these files are designated as MENU.aaaa, where aaaa is the name for a "type" of menu. These names and a functional work category for each are as follows:

Name	Functional Work Category
MAIN	Water data-processing options
PRIM	Primary computation
DISP	Display and retrieval
RTRV	Retrieve and write
SUPP	Update support files
SATL	Process satellite data
MANT	Maintenance (files)
APPL	ADAPS applications
LAPP	Local applications
PDOC	Documentation
UTIL	Miscellaneous utilities
HTBX	Hydrologic toolbox

The files associated with each of the above menu types contain the names of the main computer programs (submenu options) that are invoked from within that menu.

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7   ADAPS MENUS AND PROGRAMS

This section describes the generalized ADAPS menu system. The system is generalized in that once in ADAPS, the user can perform work tasks either by (1) following a group of two-character main menu options and associated selections, or (2) by entering the name of the main program that performs the desired task. This section covers the main menu-associated submenu and program selection operations, use of the menus to get directly to a desired task, and how to add a program to the menu system. In addition, the functional categories of tasks that are accessible from the menus are listed, as well as the section in the manual where that functional category is described. The steps for processing station records are presented in Attachment C of the ADAPS User's Manual.

7.1 Introduction

The water data-processing system is primarily menu-driven. The menus are invoked interactively, are easy to use, and they offer appropriate options by which to process water data.

The ADAPS menus consist of a main menu and associated submenus. The main menu has options for selecting a desired work category. Each option (category) has submenu options for selecting specific work tasks. Once a specific submenu option is selected and a program is invoked, further options in menu or question form are displayed. These later options are from individual task-specific processing programs. The processing proceeds interactively, and may be completed later as a phantom job (no terminal communication required) in batch mode.

The menus are accessible simply by entering the word ADAPS if the word is stored as a UNIX command. In the main menu, the user selects one of several two-letter alphabetic options, and in the submenus, the user selects 1- or 2-digit numeric options. The main and submenus are interconnected so that the user can move from submenu to submenu or from submenu to main menu, etc., rather than having to return to the main menu and proceeding from there. Once a data-processing step has been completed, control usually returns to the menu, and the user can select another option. Menu options that provide for movement within the menus and for exiting from the menu are clearly indicated.

A particular submenu option may be repeated in another menu as a convenience feature; an example is the option to produce a daily-values table. Repeating the option in different menus saves the user from having to move from the current menu to another to obtain a table, thereby saving time while doing a particular task.

Another feature allows the user to select tasks by entering the name of the program, rather than invoking the program using the submenu option. The program name is keyed in from the main menu or from any of the submenus; even from a submenu in which the desired option does not appear. A list of all program names and a brief description of each program/function is displayed by keying "PGM" followed by a <CR>.

An online description for a particular menu or program's options and functions are displayed by entering either "DOC nn", where nn is the 1- or 2-character menu option, or by entering "DOC xxxx" where xxxx is the program name.

The system allows you to proceed directly to the desired processing task without having to wait for the menus to display and then make a selection. This is accomplished by keying "ADAPS" followed by either the desired main menu and submenu options (each separated by a blank), or by the program name. For example, to go directly to the primary processing program from UNIX, you could key in either "ADAPS PR 10" or "ADAPS PRIMARY" (assuming that the primary processing program is PR submenu option 10). You also can go directly to the primary processing submenu by keying "ADAPS PR". You also can stop after the PR. An additional feature, invoked by keying "-NM" for No Menus (an example is "ADAPS PR 10 -NM" or even "ADAPS -NM"), suppresses the displays of the menu(s) and puts you directly into the desired data-processing program with its own menus or questions.

After you are familiar with the menus and with routine processing, use of these features speeds up the processing. These features also can be used in a user's abbreviation file (Seybold, 1985, p. 4-5) to save time for accomplishing such repetitive tasks as translating paper tapes. The abbreviation file will contain the statement "ADAPS PR 10 -NM" or "ADAPS TP_READ -NM".

All users do not see all menu options displayed on their terminal screens. ADAPS has four levels of user access: System Administrator (SYST), ADAPS Data Base Administrator (ADBA), User (USER), and Cooperator (COOP). SYST-level users see all options. ADBA-level users see all options except for those related to such PRIMOS functions as MIDAS file creation and maintenance, and starting and stopping the Satellite processing phantom. USER-level users see options related to records processing and data retrieval. COOP-level users only see options for retrieval of data. An additional user-access level is used in ADAPS; it consists of the "H" prefixed to three of the above four access categories (i.e., HSYS, HDBA, HCOP). The "H___" access level applies only to host sites that are part of the SATIN system.

Capabilities are provided to allow District ADAPS System Administrators to change certain ADAPS access levels (SYST, ADBA, USER, or COOP) of the ADAPS programs, thereby tailoring the ADAPS system to a particular District's needs. If Districts change the access levels, the numbering of submenu options may differ from District to District, and possibly from user access level to user access level within a District. Adding programs to the ADAPS menu system and the user-access files is discussed in the next section.

Since the task selections (submenus) under the main menu may vary from District to District, they are not presented here. The emphasis in this manual is to refer to the different work tasks by main computer program name, rather than by menu and submenu options. Therefore, in the following sections descriptions of the ADAPS programs (submenu options) are presented by functional category. The attachment at the end of this manual

contains the <u>default</u> ADAPS menu and submenus arrangement. This attachment also is included in the ADAPS User's Manual for convenience.

Note that many programs create control files, output files, and error files in the user's origin directory; it is up to the user to manage (keep or delete) these files.

7.2 Adding Programs to Local Applications Menu

The Local Applications (LA) menu is currently, like all the other menus, a fortranized sub-menu. Therefore, if it is to run correctly, a program to be placed within the LA menu must be written similar to the other ADAPS programs. To place a program within the LA menu, follow these steps:

1. Use the S_STRT subroutine to open the MIDAS files. S_STRT can do many other things, but can be scaled down (through the options) to be fairly minimal. The options for S_STRT are found in comments in the source code, in the directory */watstore/adaps/adrsrc/start_lib/s_strt.f*.

2. Open all sequential files with S_FILE and close with S_SCLOSE to ensure that the sequential file units do not overlap the MIDAS file units. Copies of the S_FILE.F77 and S_SCLOSE.F77 subroutines are found in the directory *watstore/library/sub_lib*.

3. Use the S_STRETR subroutine in place of STRETR for Site File activity for picking up the ADAPS site-level security. S_STRETR uses the same arguments as STRETR. STRETR.F77 is found in the directory */watstore/library/wat_lib*.

4. Use the S_MDxx subroutines to access the ADAPS MIDAS files. These subroutines are found in the directory */watstore/library/sub_lib*.

5. Exit the program by using S_EXIT. (The combination of S_STRT and S_EXIT allows the program to run as a stand-alone or as part of the menu system.) S_EXIT is found in the directory */watstore/library/sub_lib*.

To write an ADAPS program, place all the subroutines in separate files in a source directory, along with along with a *Makefile* that installs the executable into the directory *$NWISHOME/local/util*. For example, keep the files in a directory named */watstore.local/adaps/local_app*, where *local_app* is the name of your local application program. In this directory there would be the files: *local_app.f*, *Makefile*, and *.f* files for any other subroutines needed. If set up this way, compile and load it for testing as follows:

```
cd /watstore.local/adaps/local_app
gmake
$NWISHOME/local/util/local_app
```

An example program and Makefile is in the NWIS distribution in the directory *$NWISHOME/local/samples/local1*. To port an existing Prime local application, do the following:

1. As described above, create a directory to hold the main program and it subroutines; for example:
    /watstore.local/adaps/local_app.

2. Copy all the Prime .f77 files into this directory

3. cd to the checked-out directory
   cd /watstore.local/adaps/local_app

4. Run all the .f77 files through the f77_f filter.
    f77_f '*.f77'
   Keep an eye out for warnings about hard-coded Prime pathnames.

5. Remove the old .f77 files (you can always get them back from wherever you copied them from in the first place).
   rm *.f77

6. Look at each .f file in the new directory and do the following:

   A. Make sure it has a comment block.
   B. Make sure the "Purpose" section is not blank.
   C. Remove the pathnames from all include statements.
      Change *include /watstore/support/ins.dir/xxxx.ins* to *include xxxx.ins*
      If you are running the latest version of f77_f, this will already have been done by step 3 above.
   D. Change any file names with "$" to "S", for example,
      a$keys.ins.ftn becomes *aSkeys.ins.ftn*.
   E. Remove "/rev85.1" from any pathnames.
   F. Find any hard-coded pathnames (usually start with "*/watstore*").
      Remove the "*/watstore*".
      Prefix the first use of the pathname with a call to nwf_add_nwishome.
      Examples:

      character parmpath*128
      DATA parmpath/'/watstore/support/parmfile'/
       ...
      call openm$ (parmpath,ints(26) . . .

      becomes:

      character parmpath*128
      DATA parmpath/'support/parmfile'/
       ...
      call nwf_add_nwishome(parmpath)
      call openm$ (parmpath,ints(nlen$a(parmpath,ints(128))) . . .

      Another example:

      call s_file (' ','/watstore/support/fipsflat', ...

becomes:

character fipspath*128
. . .
fipspath='suppoprt/fipsflat'
call nwf_add_nwishome (fipspath)
call s_file)' ',fipspath, . . .

G. Find any calls to subroutines that expect a statement number as an argument.
Make sure an actual statement number is there and not a "0" or "ints(0)".
For example:
call s_qryc ('Enter path name',' ',0,0,0,128,pathname,,0)

becomes:
call s_qryc ('Enter path name',' ',0,0,0,128,pathname,*990)

A partial list of routines that have statement numbers as arguments follows:
From mds_lib: add1$, delet$, find$, lock$, next$, updat$
From sub_lib: s_bada, s_erms, s_exst, s_inpm, l_cdvfy, s_jobsub, s_mdop, s_phant,
s_qrpr, s_qrwy, s_qrya, s_qryc, s_qryi, s_qrym, s_qryr

H. Remove any code writing two octal ^201 or ^001 characters to print output files.
Usually there will be an I*2 variable initialized to ":401" in the code.

7. Copy the example Makefile
cp $NWISHOME/local/samples/local1/Makefile.

8. Edit Makefile
A. Change the program name:
Replace "local1" with your program name wherever it appears.
B. In the section starting with the comment lines:
#
Set source object files list
#
Add a line for each subroutine other than the main program that you have.
For example, if you had files sub1.f, sub2.f, and sub3.f along with local_app.f
(main program), the section would look like:
#
Set source object files list
#
OBJS=\
$(PROGRAM).o\
sub1.o\
sub2.o\
sub3.o
C. In the section starting with the comment lines:

```
#
# Set include file list
#
```

Edit the list to be just the include files needed for your local application.

D. In the section starting with the comment lines:
```
#
# Set list of libraries to load (for dependencies)
#
```
Edit the list to contain all the NWIS libraries needed to get a complete load of the program. You can use your LIST.OF.LIBRARYS file from the Prime as an initial guide.

E. In the section starting with the comment lines:
```
#
# Set "system" libraries list (not in dependencies)
#
```
put any non-NWIS libraries needed, such as the gdiu and disspla libraries or the imsl library.

9. gmake, fix, gmake, fix, gmake . . . Until you get a complete load and the program runs OK.

10. "gmake install" to get a clean load and a cleaned-up source directory

To add the finished program to the Local Applications (LA) menu, follow the instructions below.   Note: In these instructions, local_app is the program name, and /watstore/local/ adaps/local_app is the directory name.

1. Add a line to the file $NWISHOME/support/adaps_menus/entry.levels giving the program's ADAPS local application access level (LCOP, LUSR, LDBA, or LSYS), its entry name (from the PROGRAM or SUBROUTINE statement), and a brief description.
    Example: LCOP LOCAL_APP   Local Application

2. Add a line to the file
    $NWISHOME/support/adaps_menus/menu.lapp
    giving the program's entry name and the same brief description.
    Example: LOCAL_APP   Local Application

Since the entry.levels and menu.lapp files are changed by adding new programs for each ADAPS release, steps 1 and 2 need repeating for each ADAPS release.

7.3 Functional Categories

Sections 9, 10, and 11 of this manual contain documentation for the various ADAPS programs arranged by functional category. Only SYST and ADBA access level programs are

presented in this manual; other programs are described in the ADAPS User's Manual. The functional category and a brief description of each is given below.

FUNCTIONAL CATEGORY	DESCRIPTION	SECTION
SUPPORT FILES	Update ADAPS Support Files	9
SATELLITE TELEMETRY	Monitor Satellite Telemetry	10
FILE MAINTENANCE	Maintain Files and Flags	11

Program names, a task description, and a task description section reference are given within the discussion of each section. Note: Either the program name given or a numeric submenu option can be entered to select or perform a particular task.

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8 SUPPORT FILES

This section presents the programs that are used to update ADAPS support files. These programs provide for update, review, and deletion of records in the support files. The update function allows for adding, editing, displaying, and listing of data. Program names and task descriptions are shown below:

PROGRAM NAME	TASK DESCRIPTION	SECTION
SE_EDIT	Update Security File	8.1
ND_EDIT	Update DIS Node Configuration File	8.2

8.1 Update Security File

The **se_edit** program is used to update the Security File.

Not available.

8.2 Update DIS Node Configuration File

The **nd_edit** program is used to update the Node Configuration File. This file is an important ADAPS file because it contains information on node hardware and configuration. This section briefly discusses the file and indicates how to update Node File information.

8.2.1 Introduction

The Node Configuration File contains local node information. This information is about the plotters, printers, tape translators, and batch queues that are available to the users. Additional characteristics such as office identification, network node identification, data bases, SATIN program control parameters, and maintenance control parameters are included in the Node File. The Node Configuration File must be set up by the Data Base Administrator (DBA) before users can access any programs or data.

The ADAPS node updating program allows the DBA to display, list, update, add, and delete data in the Node Configuration File. The program has updating functions, each of which is selected via a program submenu. Each function allows for listing, updating, adding, and deleting the variables defined as a specific function. Not every site will need all 11 menus available in the program. Submenus 1-6 are available for all sites; submenus 7 and 8 are only for sites that run the SATIN processing system; and submenus 9-11 are for DRGS sites only. Once the Node Configuration File information has been entered, very little updating of the file is necessary. An update requirement would be to create new entries for printers or plotters, or to modify a parameter to meet new processing requirements.

The 11 submenus and their options are discussed in succeeding sections of the manual. The options presented within the submenus are numeric.

8.2.2 Update Node ID Data

The node identification (ID) data consist of general information such as the node name, network node ID, FIPS District code, time zone information, and type of SATIN site. This option displays the data, and any of the fields displayed can be edited except for the ADAPS Release Number and number of data bases that are established on the system.

8.2.3 Update Data-Base Information

Multiple data bases are allowed in ADAPS. This allows a node (District) to divide its stations into logical groups. This is only recommended for multi-State Districts where there is a definite need to break the data into separate individual State data bases. A multiple data-base system takes up much more disk space and CPU resources than a single data base. Presently, it is not recommended to have more then one data base because the SATIN data collection system operates only on one selected data base, and the conversion from the earlier ADR and satellite systems transfers data only into the first data base listed. The available submenu options are as follows:

- ❏ LIST EXISTING DATA BASES
  This option provides a list of all data bases stored in the node file.

- ❏ UPDATE AN EXISTING DATA-BASE DESCRIPTION
  This option is used by the DBA to change the data-base number or the description of the data base selected.

- ❏ ADD NEW DATA-BASE INFORMATION
  This option is used by the DBA to add a new data-base number and description to the node file. It is recommended that the data-base numbers be in sequential order, i.e., use 1 for the first data base, 2 for the second, and so on. A maxmium of 10 data bases are allowed.

- ❏ DELETE AN EXISTING DATA-BASE ENTRY
  This option is used to delete a data-base entry no longer in use. Deletions should be done with caution, as any data associated with the data base being deleted will no longer be available.

8.2.4 Update Printer Information

ADAPS requires that all printers have the following information stored: 1) a printer description, 2) a printing width, 3) whether or not there is to be header suppression, and 4) how communication is carried out. This information allows the users to select their output destination. Communications with each printer is specified by a system destination name, form name, or user number, and thus allows for a wide range of printers to be available including system printers, remote printers, and printers tied to user terminals. The available submenu options are as follows:

❑ LIST EXISTING PRINTERS
This option provides a list of all printers stored in the Node File.

❑ UPDATE AN EXISTING PRINTER
This option is used by the DBA to change any or all of the printer information in order to meet new needs.

❑ ADD NEW PRINTER
When adding a new printer to the Node File, the DBA is defining how the printer is described in printer lists, what its characteristics are, and how ADAPS communicates with the printer. If the printer is a local system printer, the destination name or form name defines where to send the output. If the printer is tied to a terminal, the user line number indicates that the output must be routed through that terminal so that the appro- priate control signals are sent to shut off terminal printing. If the printer is a remote printer, the AMLC line number defines where the output is to be routed. When adding a new printer, information on the printer width in characters and whether or not a printer banner is to be suppressed is also required.

❑ DELETE AN EXISTING PRINTER
This option is used by the DBA to delete a printer no longer in use.

8.2.5 Update ADR Tape Translator Information

In order to translate ADR 16-channel paper tape data, ADAPS requires that certain infor- mation be entered into the Node File. The information needed is a description of the trans- lator, the type of translator, the AMLC line number, and the communications protocol. The available submenu options are as follows:

❑ LIST EXISTING ADR TAPE TRANSLATOR
This option provides a list of all ADR paper tape translators stored in the Node File.

❑ UPDATE AN EXISTING ADR TAPE TRANSLATOR
This option allows the DBA to change any or all of the selected tape translator information in order to meet new needs.

❑ ADD NEW ADR TAPE TRANSLATOR
This option allows the DBA to enter the information that defines a new ADR paper tape translator.

❑ DELETE AN EXISTING ADR PAPER TAPE TRANSLATOR
This option allows the DBA to delete an ADR paper tape translator that is no longer in use.

8.2.6 Update Queue Names

ADAPS makes use of the batch queue system to run a variety of programs in batch mode. This is done to avoid overloading the system. The DBA must establish which batch

queues are to be available to the users. These batch queue names must be entered into the Node File. The available submenu options are as follows:

❏ LIST EXISTING QUEUE NAMES
This option provides a list of all queue names stored in the Node File.

❏ UPDATE AN EXISTING QUEUE NAME
This option allows the DBA to change any of the selected queue names.

❏ ADD NEW QUEUE NAMES
This option allows the DBA to enter the information to define new queue names.

❏ DELETE AN EXISTING QUEUE NAME
This option allows the DBA to delete queue names that are no longer in use.

8.2.7 Update SATIN Information

Certain information is needed to execute the SATIN background program, such as the login ID by which to execute the program, the communications timeouts, the type of SATIN system that is operating, and the login ID's of persons to be notified in case of problems. This option displays information at the terminal, and the DBA can update any data field that needs to be revised.

8.2.8 Update Scheduled Operations Information

The SATIN processor executes a background program scheduler for automatic file maintenance and for any local applications programs that are tied to the SATIN or ADAPS system. This scheduler needs data indicating the hourly interval for the hourly schedule, the time of the daily scheduled operations, and the day for weekly scheduled operations. Flags relating to the MIDAS file maintenance are also contained in the Node File and are needed for use. This option displays the scheduled operations information at the terminal, and the DBA can update any of the data fields.

8.2.9 Update Backup Node Information

The backup node information is used to describe the SATIN DRGS nodes that provide backup relay of DCP transmissions in case of failure of the node's DRGS, or of a DRGS node that your node provides a backup relay of DCP transmissions to in the event of failure. The information also describes the backup node, the time interval between transmissions of status information, the time interval between status checking, and the time interval needed to trigger the backup transmission. The available submenu options are as follows:

❏ LIST EXISTING BACKUP NODES
This option provides a list of backup nodes entered in the Node File.

❏ UPDATE AN EXISTING BACKUP NODE
This option allows the DBA to change any of the variables defining the backup node selected.

❏ ADD A NEW BACKUP NODE
This option is used by the DBA to add a new backup node to the Node File. A backup DRGS node name is required. Enter the send-status timeout if the node entered is to back up your node. Enter the check-status timeout if your node is to back up the node being entered. A backup timeout is also required if the check-status timeout has been entered. Both check-status and send- status timeouts do not have to be entered; that is, your node may back up another node and it doesn't have to back up your node, or visa versa, or both nodes may back up each other.

❏ DELETE AN EXISTING BACKUP NODE
This option is used by the DBA to delete a backup node entry no longer in use.

8.2.10 Update DEMOD List

A satellite DRGS collects data from the satellite receive dish and uses demodulators (DEMODS) to decode the signal into DCP transmissions. Individual DEMODS do occasionally fail, and the failures are hard to trace down. Therefore, the SATIN system keeps a list of current DEMOD numbers and failure timeouts in the Node File. This list is used to notify the selected DRGS mana- gers of possible DEMOD failures. The available sub-menu options are as follows:

❏ LIST EXISTING BACK DEMODS
This option provides a list of DEMODS entered in the Node File.

❏ UPDATE AN EXISTING DEMOD
This option is used by the DBA to change either the DEMOD number or the DEMOD timeout.

❏ ADD A NEW DEMOD
This option is used by the DBA to add a new DEMOD to the Node File.

❏ DELETE AN EXISTING DEMOD ENTRY
This option is used by the DBA to delete an existing DEMOD entry no longer in use.

8.2.11 Update DRGS Line Information

DRGS line information is required for DRGS sites. This information is used to define all communications lines that are linked with the DRGS minicomputer. The information describes the data line, whether it is a direct or dial-up line, the AMLC line number, the type of use that the line is intended for, and the phone number to dial if it is a dial-up line. The submenu options are as follows:

❏ LIST EXISTING BACK DRGS LINE RECORDS
This option provides a list of DRGS lines defined for the SATIN system.

❏ UPDATE AN EXISTING DRGS LINE RECORD
This option is used by the DBA to change any of the variables defining a DRGS line.

❑ ADD A NEW DRGS LINE RECORD
This option allows the DBA to add a new DRGS line record to the Node File.

❑ DELETE AN EXISTING DRGS LINE
This option allows the DBA to delete a DRGS line entry that is no longer in use.

9 SATELLITE TELEMETRY DATA PROCESSING

This section presents information on the Standard Entry (**sentry**) program that processes satellite data into ADAPS.

9.1 Background of Satellite Data Processing

Historically, raw data transmitted via satellite by Data Collection Platforms (DCPs) were converted to Engineering Units Message (EUMSG) format by the Direct Readout Ground Station (DRGS) host computers and then disseminated to the various Prime computers, where it was processed into the ADAPS data base by the ADAPS SAtellite Telemetry Input (SATIN) process. As the number of DCPs handled by the DRGS sites grew, the DRGS computers were being overloaded with the raw-data conversion process. Also, the transmission of DCP data using domestic commercial broadcast satellite and the reception of it by a Local Readout Ground Station (LRGS) became available, and the LRGS computers would not convert to EUMSG format. Therefore, it became necessary to transfer the raw data conversion process to the local District computers.

With the release of the DCP version of the Device Conversion and Delivery System (**decodes**) software package, and the replacement of the DRGS computers with LRGS computers, the raw DCP data is now disseminated "as is" from the LRGS computers to the District's computer. The ADAPS-SATIN process is no longer a part of ADAPS. It has been replaced with the **decodes-satin** process and the ADAPS **sentry** process. The **decodes-satin** process receives both DCP and Electronic Data Logger (EDL) data in "raw" format, converts the data to the NWIS standard data format (STDFMT), and passes the data on to the ADAPS Standard Entry (**sentry**) process. The **sentry** program then processes the data into ADAPS, computes the primary data, and runs any locally written ALERT subroutines against the input and output computed data.

Decodes and **decodes-satin** are documented in the **decodes** manual, currently version 2.4, dated October 1996, and available in the directory */usr/opt/decodes/doc*.

9.2 SENTRY Operations

The **sentry** program is actually one or more copies of the **sentry** process, one running for each ADAPS numbered data base that receives DCP or telemetered EDL data. Each **sentry** process initially processes data for its data base only. A **sentry** process can handle multiple data bases, but because the process of switching from one data base to another is time-consuming and can cause the **sentry** process to lag behind real-time, the use of this feature should be avoided.

In the default installation, where there is only one data base receiving DCP and EDL data, **sentry** is configured using the following directories and file naming conventions:

1. File comes in from **decodes-satin**:
    /usr/opt/nwis/data/sentry_depot>stddata>source.destin.rs.yymmdd.hhmmss
    where "*source*" is the Department of the Interior Network (DOINET) location ID
    (e.g., qvarsa, dutslc, sflmia) of the **decodes-satin** process that the data came from,
    "*destin*" is the DOINET location ID of the sentry_depot directory structure to which

the data was delivered, "*rs*" means real-time, STDFMT ("*bs* - backup, STDFMT is also possible), and "*yymmdd.hhmmss"* is the date and time that the file was initially created.

2. The **sentry** program renames the file:
   usr/opt/nwis/data/sentry_depot>stddata>S.source.destin.rs.yymmdd.hhmmss
   so **decodes-satin** won't try to re-open it for appending more data.

3. The **sentry** program opens the "*S.*" file **once** and reads it sequentially. For each data envelope (STDFMT "BE" record to "EE" record), it writes a temporary file:
   /usr/opt/nwis/data/sentry_depot>stddata>E.source.destin.rs.yymmdd.hhmmss
   with the current date and time in the file tag. This is done so that if there are any processing errors, only the bad envelope (transmission) is "junked" instead of the entire STDFMT file being junked.

4. The temporary file is then processed through the **std_stor** subroutines.

5. If no errors, the envelope file is archived (appended) to:
   /usr/opt/nwis/data/sentry_depot>archive>typ.source.destin.rs.yymmdd.hh
   with a new archive file being created each hour to reduce the number of files in the archive directory. "*typ*" is either DCP or EDL, depending on what type of data was sent to **sentry**.

6. If there were errors, the envelope file goes to:
   /usr/opt/nwis/data/sentry_depot>junk>source.destin.rs.yymmdd.hhmmss
   with the error messages appended to the end of the file. The errors in these files can be repaired with a text editor and the file then moved back to the *stddata* directory for reprocessing. Fix the error in either the ADAPS data base, or in the **decodes** or **decodes-satin** data bases that originally caused the error, so that future transmissions will process correctly and not go to the junk directory.

7. Every night, as part of maintenance, the **sen_unl_arch** process moves the data from
   /usr/opt/nwis/data/sentry_depot>archive to:
   /usr/opt/nwis/data/sentry_depot>to_tape>typ.aaaaa.nnnnnnnn.yymmdd

where "*aaaaa*" is the agency code and "*nnnnnnnn*" is the station number of the data in the *to_tape* file. These files need to be archived to a special set of tapes for archived data (or to WORM or CD-ROM) and deleted periodically. **WARNING: These files should not just be deleted!** They also should not be saved only to the regular system backup tapes as they are periodically re-used and the data would be overwritten. They are your "permanent" archive of the STDFMT data loaded into the data base.

Note: The above directory paths are those used only in the initial installation.
If necessary, they can be changed; for example if **sentry** were being run for more than one data base. (See next section, **SENTRY Configuration**).

9.2.1 SENTRY Configuration

Each **sentry** process, on startup and every morning immediately after Midnight, reads a file of configuration information. The configuration files are found in the directory:

/usr/opt/nwis/data/auxdata in the file *sentry.parms.dbnn*

where "*nn*" is the two-digit data base number on which SENTRY will be running.

This file contains the pathnames of the directories the **sentry** process for this data base is to use and other information. A "template" file named *sentry.parms.dbnn.master* is provided in the *auxdata* directory for editing to create the "actual" *sentry.parms.dbnn* files. The information after the equal signs (=) can be changed as needed. The rest of the file should not be altered in any way. The contents of sentry.parms.dbnn.master file are as follows:

```
SENTRY LOGIN ID                      = sentry
SENTRY DATA DIRECTORY                = data/sentry_depot/dbnn/stddata
SENTRY JUNK DIRECTORY                = data/sentry_depot/dbnn/junk
SENTRY ARCHIVE DIRECTORY             = data/sentry_depot/dbnn/archive
SENTRY TO_TAPE DIRECTORY             = data/sentry_depot/dbnn/to_tape
SCAN INTERVAL (MINUTES)              = 5
STARTING DATA BASE NUMBER            = 1
AUTOMATED MAINTENANCE (YES/NO)       = YES
MPACK UV FILES (YES/NO)              = YES
MPACK DV FILES (YES/NO)              = YES
MAINTENANCE TIME (MILITARY TIME)     = 0100
MPACK TEST, PERCENT DELETIONS        = 5
KEEP PERFORMANCE DATA (DAYS)         = 30
SENTRY MANAGER #1                    =
SENTRY MANAGER #2                    =
SENTRY MANAGER #3                    =
```

SENTRY LOGIN ID is the ID of the user under which you plan to run **sentry**. This can be any user that has ADAPS-WRITER access or higher to the data base. The ID is here just for reference purposes. On the UNIX port, you must first login as this user to start **sentry**. A special ID should be used. The user "satin" created for the **decodes-satin** process also can be used as the **sentry** user ID if given the appropriate groups (see the NWIS installation manual).

The next four lines define the directories the **sentry** process will use for this database. **Note:** The pathnames do not start with */usr/opt/nwis/*. That part of the pathname is supplied automatically by the **sentry** process. This means that **sentry** <u>must</u> use directories mounted under */usr/opt/nwis*. The pathnames in the "*.master*" file contain a "*/dbnn*" level, the suggested format for multiple data base setups. For example, if running **sentry** for data bases 1 and 2, the following directory structure should be used:

```
                      /usr/opt/nwis/data/sentry_depot
                                       |
              +------------------------+------------------------+
              |                                                 |
            db01                                              db02
              |                                                 |
    +-----+-------+--------+                      +-----+-------+--------+
    |     |       |        |                      |     |       |        |
 stddata junk  archive  to_tape               stddata junk  archive  to_tape
```
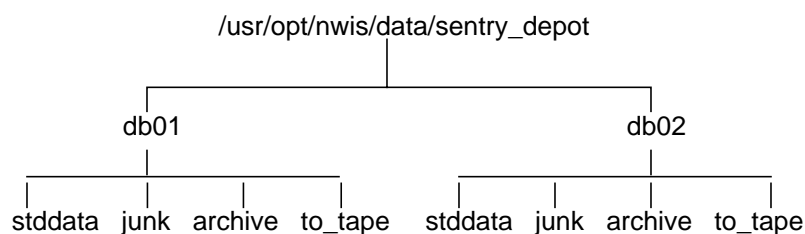
If using **sentry** on only db01 data base, remove "*/dbnn*" from the pathnames and use the default installation directory structure. The first pathname, "SENTRY DATA DIRECTORY" with the value of */usr/opt/nwis* prepended, should be in the **decodes-satin** con-

---

figuration file (*satin.cfg*) as the "server_dir" parameter for the **decodes-satin** queue that is sending data to this **sentry** process (see the **decodes** manual for more information about the *satin.cfg* file and queues).

SCAN INTERVAL is the number of minutes **sentry** will "sleep" when the stddata directory is empty before it will start searching for files to process.

STARTING DATABASE NUMBER is the "primary" data base for which this **sentry** process will handle data, and should be the same number as the "*nn*" in the *sentry.parms.ddnn* file.

The next three lines are obsolete and will be removed in future versions of the ADAPS software.

MAINTENANCE TIME is when **sentry** will run **sen_unl_arch** (Step 7 above) and delete old performance unit-values data.

MPACK TEST, PERCENT DELETIONS is obsolete and will be removed in future versions of the ADAPS software.

KEEP PERFORMANCE DATA is the number of days to keep performance unit-values. Performance data older than that number of days are deleted every day at maintenance time.

SENTRY MANAGER #1, #2, and #3 are one to three ID's of users who will have E_mail sent to them if **sentry** encounters a fatal error and must shut down. **Note**: If the error is serious enough to cause **sentry** to "crash," e-mail may not be possible.

9.2.2 Starting a SENTRY Process

A **sentry** process is started with the command:

startsentry nn

where "**nn**" is the number of the data base for which you are starting **sentry**. Before issuing this command, you must be logged in using the ID under which you want **sentry** to run.

9.2.3 Stopping a SENTRY Process

A **sentry** process is stopped with the command:

stopsentry nn [-kill]

where "**nn**" is the data base number for which you are stopping **sentry**. The command only *notifies* **sentry** to stop, but **sentry** will not stop until after the "*S.*" file (step 2 above) has been processed. If necessary to stop **sentry** immediately, the **stopsentry nn -kill** command will determine the **sentry** process ID and abort the process by issuing a **kill** command.

The **stopsentry nn** command can be run by any user with access to the **stopsentry** command. The **stopsentry nn -kill** command can be run only by the user who started sentry or as root (otherwise the **kill** comand will not work).

9.2.4 Checking SENTRY Status

Current status of a **sentry** process can be checked with the command:

sentrystatus nn [-verify]

This command looks at the ADAPS global variables, displays the process ID of the file, and the date/time and DCP ID of the transmission. If **-verify** is specified, the **sentrystatus** command verifies that the process is still running.

The **sentrystatus** command can be run by any valid ADAPS user. Status information also can be found in the log files in the directory: */usr/opt/nwis/data/systat*

Look for files named:

sentry.dbnn.yymmdd.hhmmss.log   and   *sen_unl_arch.dbnn.yymmdd.como*

A symbolic link named SENTRY.DBnn.CURRENT.LOG is maintained that points to the most recent *sentry.dbnn.yymmdd.hhmmss.log* file.

9.3 View Real-Time Data (RTSOFT)

Real-time data can be viewed by using the **rtsoft** software. **Rtsoft** is a rewrite of software originally written for the Distributed Satellite Telemetry Data Handling System (DISTDAHS), and consists of several programs. These programs require the establishment of a "master" file of DCPs for each data base that contains DCP data. These files are in */usr/opt/nwis/data/auxdata/master.dcp.list.dbnn*. In most cases, your own file of DCP sensors can be substituted for the *master.dcp.list.dbnn* file. The **rtsoft** programs are listed and described below:

rtplot [-a] -
> Displays unit-values data for sites and DD's in the *master.dcp.list.dbnn* file in a "quick and dirty" format. It can be used in auto mode to display the plots sequentially with a user-specified pause between plots. Once the plot displays begin, no user interaction is required in auto mode . In manual mode, the user can look at each plot as long as desired before typing the <cr> key to go on to the next plot. Data displayed can be restricted by date, input channel, partial station number, a word contained in the station name, or parameter code. In manual mode, it also can be restricted to user-supplied station numbers. If auto (-*a*) is not specified, the program runs in manual mode; the menus are displayed for selecting options. In auto mode, you are prompted for options.
> This program is available on the SA Menu.

stage [station_number] --
> Displays the most recent, available stage from today's record in the ADAPS unit-values file. If no station number is supplied, it displays the most recent available stage for every stage sensor in the *master.dcp.list.dbnn* file.
> This program is available to users on the command line.

rtlist --
>
> Displays the DCP data in EUMSG format from the Satin real-time queue data base for sensors in the *master.dcp.list.dbnn file*. Options are available to restrict the output by date, input channel, partial station number, a word contained in the station name, or user-supplied station numbers. Menus are displayed for selecting options. This program is available to users on the command line.

notify --
>
> A utility intended to be run daily using the cron facility. Scans the Satin real-time queue data base and generates a report of all DCP's that had either missing self-timed transmissions or more than one random transmission the previous day. The report is e-mailed to the rtnotify_users mail alias.
> This program is not available as a user command.

rtmakemaster --
>
> A utility used to extract DCP sensor information from the DECODES data base and creates, in the current working directory, *master.dcp.list.dbnn* files, where *nn* is a two-digit data base number, for each data base that contains stations from DECODES. The DBA then edits these files and places the final versions in */usr/opt/nwis/data/auxdata* for the rtsoft programs to use as the default input files. This program is not available as a user command.

rtrain --
>
> This program was not converted to the UNIX environment.

If the District has a need for any of these programs, the DCP master list files need to be installed. They are named */usr/opt/nwis/data/auxdata/master.dcp.list.dbnn* where *nn* is the two-digit data base number - one file for each database containing DCP data. Do one of the following:

❏   FTP them from the PRIME if they already exist:

> files named
> WATSTORE>ADAPS>REV85.1>AUXDATA>MASTER.DCP.LIST.DBn
> n go to /usr/opt/nwis/data/auxdata/master.dcp.list.dbnn
>
> where "nn" is a two-digit database number.

or:

❏   Create new templates from the DECODES database:

> Run command rtmakemaster in your home directory. It will extract sensor information for DCPs in the DECODES database and create a master.dcp.list.dbnn file for every database with a SITEFILE that has the DECODES site ids in it. Delete any master files for databases that do not have ADAPS Midas files and DCPs and move the other files to /usr/opt/nwis/data/auxdata after editing them.

or:

❏ Create them with an editor. Put a line in the file for each DCP input sensor DD and one for Battery Voltage. The format is:

```
       Columns   Contents
       -------   ------------------------------------------------------
         1- 8    DCP Id
         9-12    Self-timed channel number (right justified)
        13-16    Number of self-timed transmissions expected each day
                 (right justified)
        17-21    Agency code
        22-36    Station number
        37-40    DD id (right justified, leading blanks)
        41-45    Parameter code (all digits - leading zeros included)
        46-      Station name
```

Following is an example for one DCP:

```
166C519A  12   6USGS 06025500           700065BIG HOLE RIVER NEAR MELROSE,
MT.
166C519A  12   6USGS 06025500           900020BIG HOLE RIVER NEAR MELROSE,
MT.
166C519A  12   6USGS 06025500          1070969BIG HOLE RIVER NEAR MELROSE,
MT.
```

If the District plans to use programs rtlist and rtnotify, create the file
/usr/opt/nwis/data/auxdata/satin_queue_list.
This contains a list of satin queues from which **rtlist** and **rtnotify** will extract data. These are
the same queue names used as arguments to the lrgs command or the queue sub-command.
Look at file *$DECODES/setup/satin.cfg* for the QUEUE directives to get a list of queues
available at this site. The file is one line per queue name, each name starting in column 1.

❑   If the District plans to use **rtnotify**, create a crontab job to run it every day and a local
    mail alias named "rtnotify_users" that contains the userids of all the people to get the
    mail that **rtnotify** generates.

    (1) Make sure user "satin" appears in file /etc/cron.d/cron.allow or make sure it does
    NOT appear in /etc/cron.d/cron.deny (only one of these two files should be there) on
    the DECODES/SATIN/NWIS server.

    (2) Login as user satin on the DECODES/SATIN/NWIS server

    (3) Run exmh to create the MH-Mail directory and "." files. Exit exmh.

❑   Edit the file ~satin/MH-Mail/aliases (created in step C above) and add the
    rtnotify_users alias:

```
; ========================================================================
; @(#)  Personal EMail aliases for MH
; ========================================================================
; syntax for aliases is,
;
; alias: user1, user2, user3, etc.
rtnotify_users: user1, user2, user3, user4
```

❑ Create or modify file *.crontab* using editor of choice. Insert the following line(s) - one per data base that contains DCP data:

```
0 5 * * * /usr/opt/nwis/bin/rtnotify 01 > /usr/opt/nwis/data/systat/
rtnotify.db01.como 2>&1
```

----- The 0 5 above indicates **rtnotify** will run at 05:00 am everyday

❑ Issue the command "crontab .crontab" to submit the crontab for future processing

❑ Issue the command "crontab -l" to make sure it submitted properly.

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10   FILE MAINTENANCE

This section presents the programs used for maintaining ADAPS files. These programs provide routine MIDAS (keyed direct access) file maintenance, recovering unit-values from transfer files, installing new MIDAS files, reviewing or deleting User File entries, archiving unit values to disk for tape storage, restoring unit-values from archive files, and verifying MIDAS file record links. Program names and task descriptions are shown below.

```
PROGRAM NAME        TASK DESCRIPTION                            SECTION

UV_SPLIT       Split a Unit-Values Subfile into Two Subfiles      10.1
US_EDIT        Review/Delete User File Entries                    10.2
UV_ARCHIVE     Archive Unit Values to Disk for Tape Storage       10.3
UV_RESTORE     Restore Unit Values from Archive Files             10.4
VERIFY         Verify MIDAS File Record Links                     10.5
ADSTNCHG       Change/Delete Site Identifiers for ADAPS Files Only 10.6
```

10.1 Split a Unit-Values Subfile into Two Subfiles

The ADAPS unit-values file consists of an index file, an active file, and several subfiles. Sometimes a subfile may become too large to be handled effectively, in terms of disk space used and space available for file maintenance. The **uv_split** program allows the Site Administrator to split a selected subfile into two smaller subfiles. This is done by copying every other site from an existing subfile into a new, empty subfile, and deleting the copied sites from the old subfile.

10.1.1 Unit-Values Split-Processing Steps

To split a subfile into two parts, follow these preliminary steps, all while logged in as user "nwis":

1. Use the setupdb utility to create an empty "midas" file for the new subfile. Use options *3 --> Create Table*, and then *1 --> Selected Database:* to set the database number, and finally *2 --> Create a Table by Name* and enter generic file name "UVnn" where "nn" is the new subfile number.

2. Exclude all other users from NWIS using the "locknwis" command.

3. Stop **sentry** for all database numbers.

4. Manually run a checkpoint of the NWIS database.

5. Run the **uv_split** program, as described in the next section.

6. Run another checkpoint to capture the new UV subfile structure.

7. Allow users back in with the "unlocknwis" command.

8. Start **sentry** for all database numbers.

10.1.2 Program Operation

The **uv_split** program first displays the standard ADAPS startup menu for selecting the data base. Next, a screen is displayed that reminds the user of the preceding steps that must already have been done. If the preceding steps have not been done, the user may now halt processing. The user is then prompted for the generic identifiers for the subfiles to split FROM and TO, and there are checks to ensure that the files exist and that the user has write-access to the files.

Then, the split process runs, copying every other site from the FROM subfile to the TO subfile, deleting them from the FROM subfile as it runs. The UV index file record for each moved site is updated to indicate the correct subfile for that site. Record counts by site for records copied and retained are reported to the user's terminal.

10.2 Review/Delete User File Entries

The **us_edit** program allows the system or Data Base Administrator to review the contents of the User File for a particular user (useful when helping to resolve problems), and to delete non-ADAPS users from the file. It also allows adding new users, although this should usually happen automatically the first time a user runs an ADAPS program. The user's retrieval group files may also be deleted by use of this program.

A list of users contained in the file is displayed. After entering a user ID from this list, the contents of the User File for that user is displayed. The program then queries for a selection from a menu of deletion options (including no deletion). If the user ID entered does not appear in the User file, the program queries if addition of the user is desired. After the selected processing occurs, the process is repeated until the ADAPS Administrator exits from the program.

10.3 Archive Unit Values to Disk for Tape Storage

The **uv_archive** program is used to write data from the unit-values MIDAS files to a series of disk files suitable for archival to tape.

10.3.1 Introduction

A large amount of unit-values data can be stored in ADAPS. In addition to the raw input data, various types of computed unit-values data can also be stored. The amount of unit values possible for storing can easily become more than is possible to store on the available disk space.

The Unit-Values File archive program is used to write the unit-values data for an entire water year to a series of disk files, one per station, and delete the data from the unit-values MIDAS files. The disk files can then be backed up to tape and deleted from the disk.

Depending on the number and size of the subfiles, the program can either be run for all unit-values subfiles at once, or it can be run several times for selected subsets of the unit-

---

values subfiles until all have been processed. The output disk files can be transferred to offline storage media and deleted from the disk after each run to ensure the availability of enough disk space to hold the output disk files from each run.

Users (including **sentry**) can continue to use ADAPS during the archival process as long as they do not attempt to process data in the water year being archived. There is, however, nothing in the program to enforce this restriction. You need to know what is going on in your data base and decide accordingly whether to allow access while the **uv_archive** is running.

10.3.2 Archival Procedures

When archiving unit-values, follow these steps:

1. Select (or create) a directory to hold the archive files. Ensure that this directory is on a partition with a large amount of free space.

2. Exclude all other users from NWIS using the "locknwis" command.

3. Stop **sentry** for all database numbers.

4. Manually run a checkpoint of the NWIS database.

5. Warn users that in the event the **uv_archive** process fails, the data base may have to be rolled forward to the checkpoint just taken..

6. Start **sentry** for all database numbers.

7. Allow users back in with the "unlocknwis" command.

8. Run the **uv_archive** program, as described in the next section.

9. After the **uv_archive** processing is finished, run the Ingres schema_editor utility to compress the unit-values tables and recover the disk space freed by the archival.

10.3.3 Archive Program Operation

The unit-values archive program, **uv_archive**, is an interactive preprocessor program to get program options from the user with a batch-mode program to do the actual work.

In the preprocessor, the user is queried, by use of the ADAPS menus and query routines, for a data base, water year, work directory, and set of unit-values subfiles to be processed. All the archive files will be placed in the specified directory. The batch job to do the archiving is then submitted.

The batch postprocessor does the following:

1. Reads every record in each selected unit-values subfile and writes the records "qualifying" for archival (in the specified water year) to sequential files in the specified archival directory, and then deletes the records from the unit-values subfile.

2. Writes a separate file for each site named "*UDBnn.agncy.station.yyyy*"
    where:
    nn = data base number,

> *agncy* = up-to-5 character agency code,
> *station* = 8-15 character station number, and
> *yyyy* = water year.

The files are written using the ASCII standard record format developed for the DECODES field recorder software. The WRD standard unit-values archive format is described in Attachment B.

10.4 Restore Unit Values from Archive Files

The **uv_restore** program restores unit-values data from any standard ADAPS unit-values archive files to the ADAPS Unit-Values File.

Note: *If a site does an FTP from the Prime using lowercase, the filenames will be lowercase on the DG. The file names <u>must</u> be in uppercase or the **uv_store** program will fail. The uppercase can be done with the following korn-shell script:*

```
#!/bin/ksh
for afil in udb01.*
do
mv $afil UDB01.${afil##udb01.}
done
```

10.4.1 Introduction

The standard ADAPS unit-values archive files are produced in the **uv_archive** program, which archives all unit values for a specified water year into files using a WRD standard archive format. The **uv_archive** program then deletes those unit values from the unit-values MIDAS file. In many cases, certain unit-values records are not to be deleted from the system, or there is a need to have certain unit-values records, which were archived, back into the ADAPS unit-values files. The **uv_restore** program allows the user to specify certain sites, DDs, and types of unit values (edited or computed) to be restored from files brought back from the archival offline storage media (magnetic tape, CD-ROM, etc.), or to automatically restore unit values from all archive files in a specified directory. The WRD standard unit-values archive format is described in Attachment B.

10.4.2 Program Operation

The **uv_restore** program begins with the ADAPS startup routine used for specifying the user's ADAPS work directory and the data base. A menu of default options is then displayed.

The first option is selecting the directory where the archive files reside. The default directory name is */usr/opt/nwis/data/to_tape*. This directory name can be changed by selecting the AD option in the ADAPS startup operation.

The next option is the restore option, which the default specifies for restoring all standard archive files in the specified directory. To restore only certain files in the specified direc-

---

tory, or selected sites, DDs, or unit-values types, select the RO option. If satisfied that these two options are correct enter a <CR>. If the option to specify sites, DDs, and/or types of unit values is selected, the program:

1. searches the directory for all archive files and each site,

2. queries for rejecting each site or a list of DDs to be processed for the site, and

3. queries for the data type (edited unit values and/or computed unit values) of the unit values to be loaded into ADAPS.

If the option to load all archive files in the directory is selected, the user is not queried for other options. The program then processes the unit-values archive files as specified. The progress of the program is written to the log file, along with any generated error messages. For each site and parameter that has data processed, a summary including the site name, the parameter name, the type of data, and number of data values is printed.

If existing data are encountered that will be overwritten by data from the archive file, the program prints a warning message and asks permission to overwrite the existing data. If the answer is YES, the message and query will not be repeated during processing of that archive file. If the answer is NO, the program stops processing the archive file and proceeds to the next archive file; however, any data processed prior to the warning stays in the data base. If a major error (non-MIDAS or non-UNIX) is encountered, the processing is aborted for that archive file and the program proceeds to the next archive file. If a major MIDAS or UNIX error is encountered, the program prints out an error message and stops.

10.4.3 Processing Messages

Several messages are displayed during processing of an archive file. The most common are information or status messages, such as which site and parameter are currently being processed. Error messages are also possible and are divided into three categories: (1) major processing errors (user caused), (2) major processing errors (caused by incorrectly formated input file), and (3) standard ADAPS system errors. Standard ADAPS errors are not discussed here, but the informational messages, amd possible error messages for the first two categories are described in the next three sections.

10.4.3.1 Informational Processing Messages

Informational processing messages alert the user to some action or lack of action, and are generally due to the program options specified by the user.

```
THIS DD NOT SELECTED TO BE LOADED, IT WILL BE SKIPPED
```
The user has not specified the indicated DD for loading into the ADAPS Unit-Values File. The data for this DD will be skipped.

```
COMPUTED UNIT VALUES ARE NOT SELECTED TO BE LOADED, THEY WILL BE
SKIPPED!
```
The user has specified that only edited unit values be loaded into the ADAPS Unit-Values File. The computed unit values in the archive file will be skipped.

EDITED UNIT VALUES ARE NOT SELECTED TO BE LOADED, THEY WILL BE SKIPPED!
> The user has specified that only computed unit values be loaded into the ADAPS Unit-Values File. The edited unit values in the archive file will be skipped.

10.4.3.2 Major Processing Error Messages (user caused)

Major processing errors, which are caused by the user or user setups, immediately abort the processing of the input file. However, the user can usually fix these errors. Each error message is listed below, with a description that may help resolve the problem.

THE ARCHIVE RESTORE PROGRAM CANNOT BE USED TO LOAD STANDARD DATA INPUT FILES
> The user is attempting to use the unit-values archive restore program (**uv_restore**) to load Standard Data Input File data into ADAPS. Use the Standard data input file upload program (**std_stor**) to process these types of files.

DATA INPUT FILE IS NOT A STANDARD DATA INPUT FILE
> The input file specified for processing by this program is not in the required standard input-data format. Please specify only files in the proper format.

SITE: xxxxxxx NOT FOUND IN SITE FILE
> The USGS site identification number or agency code (xxxxxxx) specified in the input file is not in the specified data base site file. Check your program producing the input file or add the site to the data base.

DD #xxx NOT FOUND IN DD FILE
> The data descriptor identification number (xxx) specified in the input file is not in the specified data base DD file. Check your program producing the input file or add the DD to the data base.

PARM. CODE xxxxx IN DD RECORD DOES NOT MATCH PARM. CODE yyyyy ON SENSOR CARD
> The parameter code (xxxxx) from the specified data descriptor does not match the parameter code (yyyyy) on the sensor (SE) record in the input file. Check your program producing the input file or the DD record in the ADAPS DD file.

DATA xx-xx-xxxx IS FLAGGED FINAL NO UPDATE IS POSSIBLE
> The unit-values record for the indicated date being updated by data from the input file is flagged as FINAL data and no update is possible. Verify that the correct data are being processed and, if so, the unit-values record for that date needs the final/provisional flag changed before processing of this input data.

```
OVERWRITE OF EXISTING DATA REJECTED, ABORT PROCESSING
```
The user has specified that existing data not be overwritten by new data from the input file. Existing data have been found that will be overwritten; therefore, processing of this input file is aborted.

10.4.3.3 Major Processing Error Messages

Major processing errors, which are caused by an incorrect standard data-input format in the input file, immediately abort the processing of the input file. The program (**uv_archive**) that generated the input file has made a mistake. To resolve the problem, please contact the programming staff responsible for that program. Since the user cannot correct these problems, no explanations are given to the error messages listed below.

```
BEGINNING OF ENVELOPE RECORD NOT FOUND

xxx IS AN INVALID DATA SOURCE TYPE

DATABASE RECORD FOUND, OUT OF ORDER

THE START DATA RECORD HAS NOT BEEN READ, RECORDS OUT OF SEQUENCE OR
CARD MISSING

DIFFERENT DATA TYPE ENCOUNTERED WITHOUT A SENSOR CARD CHANGE

INVALID NUMBER OF VALUES FIELD READ ON xxxxxx RECORD

ERROR ENCOUNTERED IN READING FROM INPUT FILE (FOLLOWED BY UNIX ERROR
MESSAGE)

DD ID FIELD BLANK ON SE RECORD

ERROR IN READING RECORDING INTERVAL: xxxx FROM SENSOR RECORD

INVALID STATISTIC CODE xxxxx ENCOUNTERED

THE SENSOR RECORD HAS NOT BEEN READ, RECORDS OUT OF SEQUENCE OR CARD
MISSING

THE DATE/TIME RECORD HAS NOT BEEN READ, RECORDS OUT OF SEQUENCE OR
CARD MISSING

INVALID TIME xxxxxx READ FROM RECORD

INVALID DATE xxxxxxxx READ FROM TIME CARD

INVALID TIME READ FROM TIME CARD
```

10.5 Verify MIDAS File Record Links

The **verify** program is used to verify the integrity of the ADAPS data base.

10.5.1 Introduction

The ADAPS data base consists of a set of MIDAS files and Ingres (Ingres Corporation, 1991) tables. The ability to access data in some files depends on the existence of records in other files, in particular, the Site and Data Descriptor (DD) files. The **verify** program reads every record in all the ADAPS MIDAS files and verifies that the necessary records exist in the Site and DD files, reporting to a print file or to the screen when a record is found that does not have Site file or DD file entry. An attempt is made to unpack unit-values records, and failures are reported. Successful completion of the program ensures that the MIDAS files are not damaged, as every record in every file is accessed.

10.5.2 Program Operation

The **verify** program operates in either interactive or batch mode. First, the user specifies the mode, the output destination, and the data base to be processed by using the ADAPS startup menu. If specifying batch mode, the user then submits a batch job to verify the entire data base. If specifying interactive mode, the user then selects one MIDASPLUS file to be processed immediately. The user is then repeatedly queried for another MIDAS-PLUS file until finished.

10.5.3 Error Messages

Error messages produced from the current version of the verify program are included below. For all files, each error message starts with the primary key for the records in that file.

DC (Datum Correction) File
****

```
BAD STATION
```
No entry for the agency/station was found in the SITE file.

```
BAD DD
```
No entry for the agency/station/ddid was found in the DD file.

```
BAD NUMBER OF DATUM CORRECTIONS nnnnnnnnnn
```
The number of datum corrections for the water year, is bad. It is either less than zero or more than 100.

DD (Data Descriptor) File
****

```
BAD STATION
```
No entry for the agency/station was found in the SITE file.

```
BAD NUMBER OF COMPUTE AND STORE CODES nnnnnnnnnn
```

The number of compute and store codes is bad. It is either less than zero or more than 10. Since this is not used by ADAPS it is not important for purposes of transfer to NWIS-II

BAD PARM "xxxxx"

The parameter code in the DD record was not found in the parameter code dictionary.

BAD UV STAT "xxxxx"

The UV statistic code in the DD record was not found in the parameter code dictionary.

DV (Daily Values) File
****

BAD STATION

No entry for the agency/station was found in the SITE file.

BAD DD

No entry for the agency/station/ddid was found in the DD file.

PARM CODE MISMATCH DV "xxxxx" DD "xxxxx"

The parameter code stored with the DV record does not match the parameter code of it's "parent" DD record. This is a warning only, as the ADAPS software always goes to the DD record to get the parameter code.

INVALID STAT CODE "xxxxx" OCTAL /nnn/nnn/nnn/nnn/nnn

The statistic code in the DD record was not found in the parameter code dictionary. The code is shown in octal because the ADAPS software used to create "bogus" DV records with a stat code of all null characters (Octal /000).

ER (Satin Error) File
****

BAD STATION

No entry for the agency/station was found in the SITE file.

BAD DD

No entry for the agency/station/ddid was found in the DD file.

IN (Instrument) File
****

BAD STATION

No entry for the agency/station was found in the SITE file.

BAD NUM CHANNELS nn

The number of channels is bad. It is either less than zero or more than 20.

CHANNEL nn HAS A BAD DD " nn"

The DDID stored for the indicated channel was not found in the DD file. This test is done for ADR instruments only as DCP instrument information is now stored in DECODES.

IX (Unit Values Index) File
****

BAD STATION
No entry for the agency/station was found in the SITE file.

MS (Discharge Measurement) File
****

BAD STATION
No entry for the agency/station was found in the SITE file.

nnnnnn BAD CHAR(S): /xxx/xxx ...
The character variable whose name is nnnnn contains non-printable characters, shown in octal. This was added because I thought it was happening in Utah. It wasn't, happening but I left the check in.

PR (Processor) File - in the following, "aaaaa" is an agency code, "ssssssssssssssss" is a station id, and "dddd" is a ddid.
****

BAD STATION
No entry for the agency/station was found in the SITE file.

BAD DD
No entry for the agency/station/ddid was found in the DD file.

FWD POINTER DD "aaaaasssssssssssssssssdddd" NOT IN DD FILE
The PR record had a forward pointer to another DD that was not found in the DD file.

FWD POINTER PR "aaaaasssssssssssssssssdddd" NOT IN PR FILE
The PR record had a forward pointer to another PR that was not found in the PR file.

BKW POINTER DD "aaaaasssssssssssssssssdddd" NOT IN DD FILE
The PR record had a backward pointer to another DD that was not found in the DD file.

BKW POINTER PR "aaaaasssssssssssssssssdddd" NOT IN PR FILE
The PR record had a backward pointer to another PR that was not found in the PR file.

FWD AUX POINTER DD "aaaaasssssssssssssssssdddd" NOT IN DD FILE
The PR record had a forward auxilliary pointer to another DD that was not found in the DD file.

FWD AUX POINTER PR "aaaaasssssssssssssssssdddd" NOT IN PR FILE
The PR record had a forward auxilliary pointer to another PR that was not found in the PR file.

BKW AUX POINTER DD "aaaaasssssssssssssssssdddd" NOT IN DD FILE
The PR record had a backward auxilliary pointer to another DD that was not found in the DD file.

BKW AUX POINTER PR "aaaaassssssssssssssssdddd" NOT IN PR FILE
> The PR record had a backward auxilliary pointer to another PR that was not found in the PR file.

INVALID COMPUTATION TYPE (PRTPCO) FOR A 1-OUT PR nn
> A 1-out PR record is a parameter that is "computing itself" such as QW monitor parameters like Temperature or Dissolved Oxygen, or Rainfall. Only PRTPCO values of 0, 1, and 2 are valid for these PR records.

INVALID COMPUTATION TYPE (PRTPCO) FOR A 2-OUT PR nn
> A 2-out PR is where one parameter is computing another like stage-discharge. Only a PRTPCO value of 3 is valid for these PR records.

INVALID COMPUTATION TYPE (PRTPCO) FOR A 3-OUT PR nn
> A 3-out PR is where two parameters is computing another like slope-discharge or velocity-discharge. Only PRTPCO values of 4 and 5 are valid for these PR records.

INVALID OUTPUT PARM FOR 3-OUT "xxxxx"
> 3-out PR records should only be computing Discharge.

BAD PRIMARY TYPE FLAG (PRPRM) nn
> The primary type flag (standard or historical) is bad. It should only be 0 or 1.

BAD NUMBER OF EQUATION ELEMENTS nnnnnnnnnn
> The number of equation elements is bad. It is either less than zero or more than 200. Since this is not used by ADAPS it is not important for purposes of transfer to NWIS-II.

INVALID POINTER COMBINATION, FWD "aaaaassssssssssssssssdddd",
BKW "aaaaassssssssssssssssdddd", FWD AUX "aaaaassssssssssssssssdddd",
BKW AUX "aaaaassssssssssssssssdddd"
> There are 5 types of PR records in ADAPS - Base input - used only as input to a 2 or 3-out PR, Aux input - used as input to a 3-out PR, 1-out, 2-out, and 3-out as described above. For the transfer to NWIS-II, these are distinguished by which of the four pointers are valued. This message indicates that the type of the PR with this message cannot be determined.

INVALID DV STAT CODE "xxxxx"
> The indicated statistic code for DV computations was not found in the parameter code dictionary.

RT (Rating) File
```
**************************************************************
```

BAD STATION
> No entry for the agency/station was found in the SITE file.

BAD DD
> No entry for the agency/station/ddid was found in the DD file.

INVALID RATING TYPE "xxx"
> The rating type code is invalid.

INVALID EXPANSION CODE nn
> The rating expansion code is invalid.

```
BAD NUMBER OF RATING POINTS nnnnnnnnnn
```
The number of point-pairs in the rating is bad. IT is either less than zero or greater than 100.

ST (Shift with Time) File
`*********************************************************************`

```
BAD STATION
```
No entry for the agency/station was found in the SITE file.

```
BAD DD
```
No entry for the agency/station/ddid was found in the DD file.

```
BAD NUMBER OF SHIFTS nnnnnnnnnn
```
The number of shifts for the water year, is bad. It is either less than zero or more than 100.

SV (Variable Shift) File
`*********************************************************************`

```
BAD STATION
```
No entry for the agency/station was found in the SITE file.

```
BAD DD
```
No entry for the agency/station/ddid was found in the DD file.

```
BAD NUMBER OF SHIFTS nnnnnnnnnn
```
The number of shift curves for the water year, is bad. It is either less than zero or more than 100.

UV (Unit Values) Active and Sub-files
`*********************************************************************`

```
BAD STATION
```
No entry for the agency/station was found in the SITE file.

```
NO INDEX ENTRY FOR STATION
```
No entry for the agency/station was found in the IX file.

```
BAD DD
```
No entry for the agency/station/ddid was found in the DD file.

```
BEFORE UNPACKING: BAD NUMBER OF UNIT VALUES nnnnnnnnnn
```
The stored number of unit values was invalid. It was either less than zero or greater than 1440.

```
AFTER UNPACKING: BAD NUMBER OF UNIT VALUES nnnnnnnnnn
```
The actual number of unit values computed as part of the unpacking process was invalid. It was either less than zero or greater than 1440.

```
UNABLE TO UNPACK RECORD
```
The unpacking process failed.

10.6 Change/Delete Site Identifiers for ADAPS Files ONLY

A program (**stnchange**) to change and/or delete site identifiers in the NWIS system has been available in the GWSI and QW subsystems for some time. However, prior to revision 90.1, the program did not change identifiers in the ADAPS midas files. As a result, data can exist in the ADAPS midas files that do not have an entry in the NWIS Site File. The **adstnchg** program allows deleting or changing these "orphan" sites in the ADAPS midas files. These "orphans" can be found with the Verify Midas file record links program.

Note: The **adstnchg** program updates ADAPS MIDAS files **only** and does not update the Site File or the other subsystem (GWSI and QW) MIDAS files. If you are not cleaning up "orphans," use the **stnchange** program.

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11   RECOVERY/RESTART OF SYSTEM

This section describes the procedures to recover and restart the ADAPS system in the District (local node).

11.1 Introduction

There are several types of problems that could make it necessary to recover all of ADAPS or some specific data file(s). Hardware problems may cause a head crash on the disk drive containing ADAPS, or some portion of it. One or more MIDAS files may become damaged. NWIS common data files, which are required by ADAPS, may become damaged. A data file may inadvertently get degraded or deleted.

The following sections describe the procedure for restoring the entire ADAPS system, or particular data files, assuming there are sufficient backups of the system.

11.2 Recovering All of ADAPS

If the partition that NWIS resides on is lost for some reason, all of ADAPS and its data files (if they all still reside under NWIS) will be lost. If such an event should occur, the following steps will allow you to rebuild ADAPS with a minimal amount of lost data.

1. Restore the NWIS directory from the last total backup tape that is available. This first step will be a common one for the restoration of all of NWIS including ADAPS, SWUDS, GWSI, QW, and the common area. If this step has already been done during the restoration of one of the other systems, then it will not be necessary to repeat it again.

2. The next step is to "lay in place" the most recent copy of each data file and directories containing data files from incremental backup tapes. These may not (and probably will not) all be on the same tape. Looking at indexes of the backup tapes would be very helpful. The following data files and directories containing data files should be included in this overlay process.

ADAPS specific data files (movable):

> *ixpath*
> *dvpath*
> *dcpath*
> *stpath*
> *svpath*
> *rtpath*
> *mspath*
> *ddpath*
> *prpath*
> *inpath*
> *erpath*

ADAPS related data files (not movable):

master.file.midas

ADAPS specific directories (not movable):

archive
auxdata
rtdata
systat
transfer

ADAPS specific directories (not movable):

to_tape

ADAPS related directories:

watin (to capture Site File updates)

This process should ensure that the most recent copy of each MIDAS file that is backed up directly is put back in place. The only data lost from these files should be what has been processed since the incremental backup that each file was taken from.

In addition to the MIDAS data files that are directly backed up on an incremental basis, there are other very important MIDAS files that are backed up indirectly using "flat" transaction files. One set is the ADAPS unit-values file and its subfiles, UVPATH and UVnn, where nn = the subfile number. The other is the ADAPS related (and required) Site File.

To recover the ADAPS unit-values file(s) you need to restore all of the transaction files made since the last total backup to */usr/opt/nwis/data/to_tape/inc.back*, and then run the unit-values recover program **uv_recover**. You should then delete the incremental backup transaction files used in the recover process. DO NOT delete any transaction files that have not been backed up. The only unit-values data lost will be what has been processed since the last incremental backup.

Recovering the NWIS Site File should be coordinated with the local GWSI Data Base Administrator. You have already put in place a copy of the Site File from the last total backup. Now you should ensure that all Site File update files from each incremental backup tape are restored from one tape at a time. The update files from each incremental tape should be processed into the Site File using the GWSI Site File interface. Follow this pattern until all Site File update files from each incremental backup tape done since the last total have been restored and processed. Any Site File data processed since the last incremental backup will be lost.

11.3 Recovering Damaged Data Files

The process for recovering individual data files is similar to recovering the entire system, but on a smaller scale. If a MIDAS file has been lost or damaged you should first delete

---

the bad file; if the file is damaged you may not be able to KIDDEL the file. Then locate the last incremental backup tape that contains that file and restore it. If that file is also damaged, try the incremental tape from the day before. Continue that process until you restore one that is not damaged. Obviously, the data lost from that file will be whatever has been processed since the day of the incremental that was used.

If the unit-values file(s) or the Site File are lost, follow the instructions given in section 14.2 for their recovery. Remember to first restore a copy of the MIDAS file from the last total backup tape before proceeding with the incremental recovery process. **Note**: The best way to verify that a MIDAS file brought back from tape is not damaged is to MPACK it, using the "Data" option, and inspect the MPACK log or output.

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12   ARCHIVAL OF DATA

The permanent archival of original data, which consist of the unaltered Automatic Digital Recorder (ADR) tape files and DCP transmission files, is the responsibility of either the District (node) site manager, the local ADAPS Data Base Administrator, or personnel assigned by either. A directory is provided for the temporary storage of archival data. The name of the directory is */usr/opt/nwis/data/to_tape*.

When temporary ADR tape files are deleted by the users, they are first copied to an ADR directory of the *to_tape* directory. When the archive area of the **SENTRY** system is cleaned up, the DCP transmissions are copied to the DCP directory of the *to_tape* directory. It is then up to the person assigned to archive the data to either write the data to a magnetic tape and then delete the data, or to just delete the data (not recommended). It is recommended that the ADR and DCP data be written to separate magnetic tapes and appropriately labeled, so the data can be retrieved at a future date, if necessary.

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13   DATA GRAPHICS

This section discusses the graphic capabilities (plotting of water data) available in ADAPS. Use of preprinted hydrograph forms for plotting daily-values time-series data and graphic devices are covered, and the plotting variables that can be set are given.

13.1 Introduction

The use of graphics in ADAPS is an important part of the system. Hydrographs of water data are routinely drawn for quality control and report purposes. X-Y type plots are also drawn for showing the relationships between variables and for other purposes. ADAPS presently uses two basic plotting packages: **plotwat** for unit- and daily-values data, and daily-values hydrographs on preprinted form paper. Use of **plotwat** and the program that uses preprinted forms are described in the ADAPS User's Manual. The devices, forms, and variables required for plotting on preprinted forms are described in the next several sections of the manual.

13.2 Preprinted Graph Forms

The use of preprinted graph form paper saves time because the grid lines are already printed on the paper (i.e., they do not have to be drawn as part of the plotting operation). Several forms have been in use in the Water Resources Division for some time, but Form 9-285 has been used the most for computerized plotting of daily-values data. Other forms are available for computerized and/or manual plotting.

The automated use of preprinted forms requires some support information to be stored in a system file(s). This file and the information stored in it is described in the next section of the manual.

13.2.1 Hydrograph Plotting Forms

Presently, the preprinted graph forms program handles several different types of graphics devices. These devices include Tab, Tektronix, Graphon, and Hewlett-Packard.

The following plotting forms (preprinted graph paper) are available using a form number in the ADAPS hydrograph preprinted form plotting program menu (Option DI 4). See ADAPS User's Manual.

Table 1: Plotting forms

Form Number	Description	Paper Size, in inches
1	9-285(Log) and 9-285a(linear) 2-across	28.50 x 34.00
2	9-285 and 9-285, single sheet	28.50 x 34.00
3	Page Size, single sheet	11.00 x 8.50

Each of these forms have predefined plotting variables. These variables are defined in the next section of this document.

13.2.2 Definitions of Hydrograph Forms Plotting Variables

A sequential (flat) file contains numerical information that defines the layout of a pre-printed form. This information is stored in the ADAPS file named:

/usr/opt/nwis/data/auxdata/hydrograph.forms

This file can be edited by the ADAPS Data Base Administrator to adjust for variations from one print run of a form to another, and to allow for easy addition of new forms. If this file is edited, **do not delete the two header lines or realign any of the columns**. The file contains 17 variables. A list of the variables and a description for each is given below.

❑ FORM - The form number that users running the plot program(s) use to select a particular preprinted form.

❑ DESCRIPTION - A text description of the form displayed to the user at form selection time.

❑ PAGEX and PAGEY - These two variables define the X and Y dimensions of the physical sheet of paper to be used.

❑ AREAX and AREAY - These two variables define the size of the actual plotting area on the paper.

❑ PHYSX and PHYSY - These two variables define the location of the lower left corner of the plotting area in relation to the lower left corner of the physical sheet of paper.

❑ DELTY - This variable defines the distance in the Y direction from the lower left corner of one plotting area to the lower left corner of the next plotting area for those forms that have more than one plotting area per sheet (such as Form 9-285 for the 36-inch drum plotter that uses roll paper).

❑ NACRS - This is the number of plotting areas per physical sheet of paper.

❑ NCYCL - This is the number of logarithmic (log) cycles defined per plotting area for semi-log paper.

❑ NYDIV - This is the number of major divisions in the Y direction per plotting area for linear gridded paper.

❑ MESSY - This indicates how far in the Y direction from the bottom of the plot area to place the station name and number and the water year.

❑ SNAMX - This indicates how far from the left edge of the plotting area to place the station name.

❑ STIDX - This indicates how far from the left edge of the plotting area to place the station number.

❑ WTYRX - This indicates how far from the left edge of the plotting area to place the water year.

❏ FEB29 - This is a single character (Y or N) that indicates if the form has a printed grid line (plotting position) for February 29 (leap years).

13.2.3 Rating Plotting Forms

The following plotting forms (preprinted graph paper) are available using a form number in the ADAPS rating preprinted form plotting program menu (DI 10). See ADAPS User's Manual. .

Table 2: Rating plotting forms

Form Number	Description	Paper Size, in inches
1	9-3016	22.00 x 34.00
2	9-297L	16.75 x 22.00
3	9-279S	11.00 x 17.00

Each of these forms have predefined plotting variables. These variables are defined in the next section of this document.

13.2.4 Definitions of Rating Forms Plotting Variables

A sequential (flat) file contains numerical information that defines the layout of a pre-printed form. This information is stored in the ADAPS file named: */usr/opt/nwis/data/auxdata/ratplot.forms*

This file can be edited by the ADAPS Database Administrator to adjust for variations from one print run of a form to another, and to allow for easy addition of new forms. If this file is edited, do not delete the two header lines or realign any of the columns. The file contains 18 variables. A list of the variables and a description for each is given below:

Note: All dimensions and distances are in inches.

❏ FORM - The form number that users running the plot program(s) use to select a particular preprinted form.

❏ DESCRIPTION - A text description of the form displayed to the use at form selection time.

❏ PAGEX and PAGEY - These two variables define the X and Y dimensions of the physical sheet of paper to be used.

❏ AREAX and AREAY - These two variables define the size of the actual plotting area on the paper.

❏ PHYSX and PHYSY - These two variables define the location of the lower left corner of the plotting area in relation to the lower left corner of the physical sheet of paper.

❏ NCYCX and NCYCY - These two variables define the number of logarithmic

(log) cycles in the X and Y direction of the logarithmic portion of the form (lower right).

❑ ARECX and ARECY - These two variables define the X and Y dimensions of the linear portion of the form (upper left).

❑ ORELY - This variable defines the distance from the lower left corner of actual plotting area on the paper to the bottom of the Y axis on the linear portion of the form. It should usually be equal to AREAY-ARECY.

❑ NDIVX and NDIVY - These two variables are the number of major divisions in the X and Y direction per plotting area for the linear portion of the form (upper left).

❑ MESSY - This indicates how far in the Y direction from the bottom of the plot area to place the station name and number and the water year.

❑ SNAMX - This indicates how far from the left edge of the plotting area to place the station name.

❑ STIDX - This indicates how far from the left edge of the plotting area to place the station number.

14 NAMES, DESCRIPTIONS, AND SECTION NUMBERS OF ADAPS PROGRAMS

This program information is included in both the ADAPS Administrator's and User's manuals for easy reference. **Note**: An * indicates that the section is located within the ADAPS Administrator's Manual. All others are within the ADAPS User's Manual. .

Program Name	Task Description	Section Number
adstnchg	Change/Delete Site Identifiers for ADAPS files ONLY	*10.6
bld_upld	Build Upload of DV Data to Mainframe	16.4
cd_read	Process ADR Card-Image Data	7.2
dc_display	Display Data Correction Records	9.8
dc_edit	Update/Display Datum Corrections	8.2
dd_disp	Display/Print Data Descriptors	9.6
dd_edit	Update Data Descriptor/Processor Files	16.2
drfiles	Review/Delete Digital Tape Temporary Files	7.7
dsp_adoc	Display Administrator's Manual on Screen	14.3
dsp_udoc	Display User's Manual on Screen	14.1
dv_edit	Edit Daily Values	8.7
dvdaystat	Daily-Values Daily Summary Statistics	11.3
dvinv	Inventory Daily-Values Data	11.4
dv_manip	Manipulate Daily-Values Data	11.5
dvmas	Daily-Values Monthly/Annual Statistics	11.1
dvstat	Daily-Values Duration/N-day Value Analysis	11.2
dv_store	Process Daily-Values Card-Image Data	7.6
dvtable	Daily-Values Tables	9.1
dvtable_edit	Daily-Values Statistical Summary Edit	8.8
edt_upld	Postprocessing of DV Upload Files	16.5
emacs_origin	EMACS Explore of User's Origin Directory	13.3
eoysumm	End-of-Year Summary	12.3
gr_edit	Update Site/Data Descriptor Groups	13.1
hydrograph	Plot Hydrographs Using Preprinted Forms	9.3
in_disp	Display/Print Instruments	9.5
in_edit	Update Instrument File	16.1
ms_edit	Update/Display Measurements	7.5
nd_edit	Update DIS Node Configuration File	*8.2
outwat	General Retrieval of Time-Series Data	10.2
plotwat	Plot Time-Series Data	9.4
primary	Primary Computations	8.6
prt_adoc	Print Administrator's Manual	14.4
prt_udoc	Print User's Manual	14.2

Program Name	Task Description	Section Number
ratplot	Plot Ratings on Preprinted Forms	9.7
retr_dv	Retrieve/Write Daily-Values Data	10.1
rt_copy	Copy a Rating	12.4
rt_dates	Display Rating Table Dates	12.5
rt_display	Display Rating(s)	12.6
rt_edit	Update/Display Rating Tables	8.1
rtlist	Display DCP Data	15.2
rtmakemaster	Create DCP Master File	*9.3
rtnotify	Generate DCP Report	*9.3
rtplot	Real-Time Data Plot	15.2
rtsoft	View Real-Time Data	15.2
se_edit	Update Security File (ADAPS)	*8.1
sen_unl_arch	Unload SENTRYArchive Files to Per-Site Files	
sentrystatus	Check SENTRY status	15.2.5
setflag	Set Unit-/Daily-Values Record Flags	16.3
shft_tables	Display Explanded Shifts/Datum Corrections	12.1
shift_anly	Shift Analysis	12.2
shiftbar	Compute and Plot Shift Bars	12.8
showterm	Display Terminal Type	13.2
startsentry	Start a SENTRY Process	15.2.3
stopsentry	Stop a SENTRY Process	15.2.4
std_stor	Process WRD Standard Input Data	7.8
st_display	Display Shift-with-Time Records	9.9
st_edit	Update/Display Shifts by Time	8.3
sv_display	Display Variable Shift Records	9.10
sv_edit	Update/Display Variable Shifts	8.4
tp_edit	Edit/Store Translated Data	7.3
tp_read	Translate New Data	7.1
us_edit	Review/Delete User File Entries	*10.2
uv_archive	Archive Unit Values	*10.3
uv_edit	Edit Unit Values	8.5
uv_enter	Unit-Values Entry/Edit	7.9
uv_merge	Merge/Replace Unit-Values Data	12.7
uv_restore	Restore Unit Values from Archive Files	*10.4
uv_split	Split a Unit-Values Subfile into Two Subfiles	*10.1
uv_store	Process Unit-Values Card-Image Data	7.4
uv_table	Print/Display Unit-Values Tables	9.2
verify	Verify MIDAS files record links	*10.5

ATTACHMENT A - ADAPS Menu Options and Programs

This attachment discusses and lists the ADAPS two-letter mnemonic main menu and associated 1- or 2-digit numeric submenu options, and gives the names of the main computer programs associated with each of the submenu options. This attachment is included in both the ADAPS Administrator's and User's manuals for easy reference.

The main menu is arranged so that similar or complementary work categories are grouped together.

A.15 Introduction

The water data-processing system is primarily menu-driven. The menus (and programs) are invoked interactively. The options invoke individual task-specific processing programs. The system is accessed by keying the word "**adaps**." Once within ADAPS, the user selects alternate menu options. The system also allows the user to select work tasks by entering the name of a program. In addition, the system allows the District ADAPS System Administrator to change the access levels of the programs, thereby tailoring the system to individual District's needs. The District also can rearrange the work tasks (submenu options or programs) within the main menu categories. If the District changes the access levels or rearranges the menus, the numbering of the submenu options may differ from District to District, and possibly from user access level to user access level within a District. Therefore, the system has a <u>default arrangement</u>. This default arrangement is presented in the following subsections.

A.16 Main Menu Options

The main menu options are arranged (by default) so that similar or complementary work categories are logically grouped together. For each of these options, there are associated task-specific submenus. This arrangement permits the user to work without having to review displays of unrelated work functions. The main menu options and work categories available are:

```
     MENU
     OPTION              WORK CATEGORY


     IN -- DATA INPUT
     PR -- PROCESS PRIMARY DATA
     DI -- DISPLAY UNIT- AND DAILY-VALUES DATA
     RT -- RETRIEVE/WRITE ADAPS DATA
     SA -- MONITOR SATELLITE TELEMETRY
     SU -- UPDATE SUPPORT FILES/RECORD FLAGS/MAINFRAME FILES
     MA -- MAINTAIN MODE/SECURITY FILES
     AP -- ADAPS APPLICATIONS
     LA -- LOCAL APPLICATIONS
     PD -- PRINT DOCUMENTATION
     UT -- MISCELLANEOUS UTILITY FUNCTIONS
```

```
                    HT -- HYDROLOGIC TOOLBOX
```

There are three main menu options -- SU, SA, and MA, all or part of which are not seen by all users because of system security. The SU option provides the capability to update the ADAPS support and mainframe files, and the setting of record flags, and the MA option provides for maintenance of the Data, Node, and Security files. Since these options deal with the maintenance and security aspects of the system, this work is handled only by a local administrator or manager. Most programs available for these three options are documented in the ADAPS Administrator's Manual; the remaining programs are documented in the ADAPS User's Manual.

In addition to the undisplayed menu options, some users may not see the PR and HT options. The system also can be configured to control access to the AP and LA options. Only users whose jobs involve records computation have access to records-computation routines, and other users have appropriate access to the facilities needed. The next section discusses the default submenu options associated with each main menu option.

A.17 Submenu Options and Programs

This section presents a brief summary about each main menu option, followed by the available <u>default</u> submenu options, short task descriptions, names of the computer programs associated with (invoked by) each main menu option, and the section numbers within the ADAPS manual where explanations of the programs are found. The following options are shown at the end of each menu:

```
FROM THE PREVIOUS MENU -- IN, PR, DI, RT, SU, MA, AP, LA, PD, UT, HT

DOC menu_opt -- Display documentation      PGM -- Display program_names
QU -- Exit to previous menu                EX -- Exit to Unix

Select desired menu option or program_name (<CR>) for menu):
```

A.17.1 Input (IN) Menu

The IN Main Menu submenu options and programs are listed here. The main menu screen displays the following:

```
                    IN -- DATA INPUT
```

The submenu options available for this selection allow input of different forms of data into ADAPS. The programs are documented in the User's Manual.

```
        SUBMENU                                  PROGRAM      SECTION
        OPTION          TASK DESCRIPTION           NAME       NUMBER

          1 -- Translate New Data -------------- TP_READ .....  7.1
          2 -- Process ADR Card Image Data ------ CD_READ .....  7.2
          3 -- Edit and Store Translated Data --- TP_EDIT .....  7.3
```

```
 4 -- Review/Delete Digital Tape
        Temporary Files ----------------- DRFILES ..... 7.7
 5 -- Process UV Card-Image Data ------- UV_STORE .... 7.4
 6 -- Enter Unit Values from
            Digitizer/Keyboard ---------- UV_ENTER .... 7.9
 7 -- Process DV Card-Image Data ------- DV_STORE .... 7.6
#8 -- Process WRD Standard Input Data -- STD_STOR .... 7.8


    #Executed interactively or in batch mode.
```

A.17.2 Primary Computation (PR) Menu

The PR Main Menu submenu options and programs are listed here. The main menu screen displays the following:

```
             PR -- PROCESS PRIMARY DATA
```

The submenu options that are available for this selection allow operations necessary to process primary data. The programs are documented in the User's Manual.

```
    SUBMENU                                PROGRAM     SECTION
    OPTION       TASK DESCRIPTION           NAME       NUMBER

     1 -- Update/Display Rating Tables ----- RT_EDIT ..... 8.1
     2 -- Update/Display Datum Corrections - DC_EDIT ..... 8.2
     3 -- Update/Display Shifts by Time ---- ST_EDIT ..... 8.3
     4 -- Update/Display Variable Shifts --- SV_EDIT ..... 8.4
     5 -- Edit Unit Values ---------------- UV_EDIT ..... 8.5
    #6 -- Print/Display Unit-Values Tables - UV_TABLE .... 9.2
    #7 -- Primary Computations ------------ PRIMARY ..... 8.6
     8 -- Edit Daily Values --------------- DV_EDIT ..... 8.7
    #9 -- Daily Values Tables ------------- DVTABLE ..... 9.1
    10 -- Edit Daily Values Statistical Sum  DVTABLE_EDIT . 8.8
    11 -- Review/Delete Digital Tape
          Temporary Files ----------------- DRFILES ..... 7.7
    12 -- Copy a Rating-------------------- RT_COPY ..... 12.4
    13 -- Merge/Replace Unit-Values Data --- UV_MERGE .... 12.7
    14 -- PLOTWAT - Plot Time-Series Data -- PLOTWAT ..... 9.4

       #Executed interactively or in batch mode.
```

 The steps for processing station records are presented in Attachment C of the User's Manual.   The processing steps primarily involve the use of the ADAPS PR Menu, and its submenus and programs.

A.17.3 Display and Retrieval (DI) Menu

The DI Main Menu submenu options and programs are listed here. The main menu screen displays the following:

```
DI -- DISPLAY/RETRIEVE UNIT- AND DAILY-VALUES DATA
```

The submenu options that are available for this selection are used to prepare various types of visual displays for daily- and unit-values data. The options also allow the user to display rating tables and obtain an inventory of daily-values data. The programs are documented in the User's Manual.

```
    SUBMENU                                      PROGRAM     SECTION
    OPTION        TASK DESCRIPTION                NAME       NUMBER

     1 -- Daily-Values Tables ------------------ DVTABLE .....   9.1
     2 -- Print/Display Unit-Values Tables ----- UV_TABLE ....   9.2
     3 -- Preprinted Form Hydrographs ---------- HYDROGRAPH ..   9.3
     4 -- PLOTWAT -Plot Time-Series Data ------- PLOTWAT .....   9.4
     5 -- Display Instrument(s) ---------------- IN_DISP .....   9.5
     6 -- Display Data Descriptor(s) ----------- DD_DISP .....   9.6
     7 -- Display Measurements ----------------- MS_EDIT .....   7.5
     8 -- Display Rating Table Dates ----------- RT_DATES ....  12.5
     9 -- Display Rating(s) -------- ---------- RT_DISPLAY ..  12.6
    10 -- Plot Rating(s) ---------------------- RATPLOT .....   9.7
    11 -- Display Datum Correction Records ----- DC_DISPLAY ..   9.8
    12 -- Display Shift-with-Time Records ------ ST_DISPLAY ..   9.9
    13 -- Display Variable Shift Records ------- SV_DISPLAY ..   9.10
    14 -- Display Expanded Shifts and Datum ---- SHFT_TABLES .  12.1
    15 -- Daily-Values Inventory -------------- DVINV .......  11.3
    16 -- Edit/Print Statistical Summary Table - DVTABLE_EDIT .. 8.8
    17 -- Print Primary Status ---------------- PRIMSTAT ...... 7.10
```

A.17.4 Retrieve and Write (RT) Menu

The RT Main Menu submenu options and programs are listed here. The main menu screen displays the following:

```
          RT -- RETRIEVE/WRITE DATA
```

The submenu options available for this selection are used to retrieve and optionally write daily-values data or any of the time-series data (daily and unit values, and measurement/ crest-stage gage data) stored in the ADAPS files. The programs are documented in the User's Manual.

```
      SUBMENU                                  PROGRAM     SECTION
      OPTION        TASK DESCRIPTION           NAME        NUMBER

      1 -- Retrieve/Write Daily-Values Data ------ RETR_DV ..... 10.1
      2 -- General Retrieval of Time-Series Data - OUTWAT ...... 10.2
      3 -- DCP Performance Reports (AIMS) -------- AIMS ........ 15.1
```

A.17.5 Satellite Telemetry (SA) Menu

The SA Main Menu submenu options and programs are listed here. The main menu screen displays the following:

```
          SA -- MONITOR SATELLITE TELEMETRY
```

The submenu option available for this selection is used to monitor satellite telemetry by plotting recent data from sensors for review of the DCP's performance. The program is documented in the User's Manual.

```
      SUBMENU                                  PROGRAM     SECTION
      OPTION        TASK DESCRIPTION           NAME        NUMBER

       1 -- DCP Performance Reports              AIMS         --
             (not currently available)
       2 -- Real-time Data Plot ----------------- RTPLOT      15.2
```

A.17.6 Update Support Files and Flags (SU) Menu

The SU Main Menu submenu options and programs are listed here. The main menu screen displays the following:

```
SU -- UPDATE SUPPORT FILES/RECORD FLAGS/MAINFRAME FILES
```

The submenu options available for this selection are used to update files that cannot be updated by all users. For example, cooperators are not allowed to update any files, and only designated WRD personnel are allowed to update data files. Only Data Base and ADAPS administrators may update the files accessed by programs in this menu. This is necessary for system integrity and security. The programs are documented in this manual.

```
SUBMENU                                         PROGRAM    SECTION
OPTION       TASK DESCRIPTION                    NAME      NUMBER

 1 -- Update Instrument File ---------------- IN_EDIT .... 16.1
 2 -- Update Data Descriptor/Processor Files- DD_EDIT .... 16.2
#3 -- Set Unit-/Daily-Values Record Flags --- SETFLAG .... 16.3
#4 -- Build File(s) for Upload of Daily-
         Values to Mainframe ------------------ BLD_UPLD.... 16.4
 5 -- Edit DV Upload Files Before
         Transmittal ------------------------- EDT_UPLD ... 16.5


#Executed interactively or in batch mode.
```

A.17.7 Maintenance (MA) Menu

The MA Main Menu submenu options and programs are listed here. The main menu screen displays the following:

```
MA -- MAINTAIN NODE/SECURITY FILES
```

The submenu options available allow the user to update the Security, Node, and User files, and restore Unit-Values files incrementally. These operations are performed only by the local administrator or manager, for security reasons. The programs are documented in the ADAPS Administrator's Manual.

```
SUBMENU                                         PROGRAM    SECTION
OPTIONS        TASK DESCRIPTION                  NAME      NUMBER

 1 -- Update Security File --------------- SE_EDIT .....  9.1
 2 -- Update DIS Node Configuration File - ND_EDIT .....  9.2
 3 -- Review/Delete User File Entries ---- US_EDIT...... 11.2
 4 -- Archive Unit Values to Disk for
         Tape Storage --------------------- UV_ARCHIVE .. 11.3
 5 -- Restore Unit Values from ARCHIVE
         Files ---------------------------- UV_RESTORE .. 11.4
 6 -- Split a Unit-Values Subfile in Two - UV_SPLIT .....11.1
 7 -- Verify MIDAS file record links ----- VERIFY ...... 11.5
 8 -- Change/Delete Site Identifiers for
            ADAPS Files ONLY --------------- ADSTNCHG .... 11.6
```

A.17.8 ADAPS Applications (AP) Menu

The AP Main Menu submenu options and programs are listed here. The main menu screen displays the following:

```
                    AP -- ADAPS APPLICATIONS
```

Application programs in ADAPS permit selected analyses using hydrologic data from the time-series data files and from files created by other application programs. The programs are documented in the User's Manual.

```
    SUBMENU                                 PROGRAM     SECTION
    OPTIONS        TASK DESCRIPTION          NAME       NUMBER

   #1 -- Daily-Values Tables --------------- DVTABLE .....  9.1
   #2 -- Daily-Values Monthly and Annual
         Statistics ----------------------- DVMAS ....... 11.1
   #3 -- Daily-Values Duration and N-day
         Low/High Value Analysis ----------- DVSTAT ...... 11.2
   #4 -- Daily-Values Daily Summary
         Statistics ----------------------- DVDAYSTAT ... 11.3
   #5 -- Daily-Values Inventory ------------ DVINV ....... 11.4
    6 -- Daily-Values Manipulation --------- DV_MANIP .... 11.5

   #Executed interactively or in batch mode.
```

A.17.9 Local Applications (LA) Menu

The LA Main Menu screen displays the following:

```
              LA -- LOCAL APPLICATIONS
```

The purpose of a local applications section is to provide a place where locally (District) developed programs can be integrated into ADAPS. Each local administrator has the responsibility for making the proper menu, program, and documentation entries for a newly developed local application. If the application has sufficient interest divisionwide, then the entries would be made at Headquarters in the master copy of the system software and would become part of ADAPS for future software releases.

The submenu option displayed as "Local Program Number 1" is a "dummy" option. This means that no programs are, nor will be invoked unless a District adds a locally developed program. The dummy program name stored in the menu/program system is **local1**.

A.17.10 Documentation (PD) Menu

The PD Main Menu submenu options and programs are listed here. The main menu screen displays the following:

```
                    PD -- PRINT DOCUMENTATION
```

The PD option queries the user whether to display documentation on the screen or print the documentation. If the document is displayed, 24 lines are displayed at a time; the user can quit viewing at any time by keying NO in response to the --More-- screen query. If the document is printed, the user is queried for a destination and form. If the defaults are selected, the document goes to the system default printer.

The self-explanatory submenu options are not described in individual sections, but are listed below. The programs are documented in the User's Manual.

```
        SUBMENU                                 PROGRAM     SECTION
        OPTION          TASK DESCRIPTION          NAME      NUMBER

         1 -- Display User's Manual on Screen ---- DSP_UDOC .... 14.1
         2 -- Print User's Manual --------------   PRT_UDOC .... 14.2
         3 -- Display Data Base Administrator's
              Manual on Screen ------------------  DSP_ADOC .... 14.3
         4 -- Print Data Base Administrator's
              Manual  -------------------------- PRT_ADOC .... 14.4
```

A.17.11 Miscellaneous Utility (UT) Menu

The UT Main Menu submenu options and programs are listed here. The main menu screen displays the following:

```
                  UT -- MISCELLANEOUS UTILITY FUNCTIONS
```

The submenu options available for this selection are a collection of tasks (programs) that are either general in their use, peripheral to the operation of ADAPS, or directly support-ive of ADAPS. The programs are documented in the User's Manual.

```
        SUBMENU                                 PROGRAM     SECTION
        OPTION          TASK DESCRIPTION          NAME      NUMBER

         1 -- Update Site/Data Descriptor Groups - GR_EDIT ...... 13.1
         2 -- Display Terminal Type ------------- SHOWTERM ..... 13.3
         4 -- EMACS Explore of User's Origin
              Directory ----------------------- EMACS_ORIGIN . 13.6
```

A.17.12 Hydrologic Toolbox (HT) Menu

The HT Main Menu submenu options and programs are listed here. The main menu screen displays the following:

```
HT -- HYDROLOGIC TOOLBOX (MEAS./SHIFTS/DATUMS AND EOY SUMMARY)
```

The submenu options available for this selection are used to update (maintain) and display several time-series related files, perform a shift analysis, and perform an end-of-year summary (analysis) using a year of data. The programs are documented in the User's Manual.

```
         SUBMENU                                PROGRAM       SECTION
         OPTION          TASK DESCRIPTION        NAME         NUMBER

          1 -- Update/Display Measurements ------- MS_EDIT ......  7.5
          2 -- Update/Display Shifts by Time ----- ST_EDIT ......  8.3
          3 -- Update/Display Variable Shifts ---- SV_EDIT ......  8.4
          4 -- Update/Display Datum Corrections -- DC_EDIT ......  8.2
          5 -- Shift Analysis ------------------- SHIFT_ANLY ... 12.2
          6 -- End-of-Year Summary -------------- EOYSUMM ...... 12.3
          7 -- Copy a Rating -------------------- RT_COPY ...... 12.4
          8 -- Display Expanded Shifts and
               Datum Corrections ---------------- SHFT_TABLES .. 12.1
          9 -- PLOTWAT -Plot Time-Series Data ---- PLOTWAT ......  9.4
         10 -- Compute and Plot Shift Bars ------- SHIFTBAR ..... 12.8
```

This page purposely left blank.

ATTACHMENT B.   Standard Format for Transferring and Entering Unit and Daily Values

The standard format for transferring and entering unit and daily values consists of two parts: (1) an envelope for transferring unit and daily values in the recorded data format, and (2) a standard data format that is accepted by all of WRD's hydrologic data bases. The envelope for transferring data consists of information that identifies the destination of the data and its format (i.e., whether it is in the standard data format or has not yet been converted). Collection of unconverted data is necessary since data are sometimes acquired by one computer and processed by another, (e.g., data acquired by means of satellite telemetry). The standard data format consists of a sequence of records that contain all information needed to store unit or daily values for a WRD station. Both the transfer and data formats consist of different types of records that contain logically related information. Each record is identified by a record type field which consists of the first two bytes (columns) of each record. Table 2 shows the record types defined for the transfer format and table 2 shows the record types defined for the data format.

Table 3: Record types defined for transfer format

Record Type	Content	Remarks
BE	Begin Envelope	Begins Data Envelope and defines type of envelope.
DB	Data Base	Contains data-base number to be used for storing data in this envelope.
DE	DEstination	Defines destination of the data from this instrument as a list of DIS nodes (used primarily by DCP's).
MG	MessaGe	Contains a message to be sent to user responsible for this station (used primarily by telemetry systems).
RE	REmark	Contains a remark to be archived with the data.
EE	End of Envelope	End of data envelope.

Table 4: Record types for data format

Record Type	Content	Remarks
SD	Station Data	Defines station at which instrument is located and any station-dependent information needed for decoding and storing data.
SE	SEnsor Information	Defines sensor information.
TM	TiMe Information	Defines starting date and time for fixed-interval data.
UF	Unit Values -- Fixed Interval	Contains unit values stored at a fixed recording interval.
UV	Unit Values -- Variable Interval	Contains unit values stored at variable recording intervals.
UA	Unit Values -- Archive	Contains unit values retrieved from the unit-values file for archiving.
DF	Daily Fixed Time	Contains values stored daily at a fixed time.
DV	Daily Variable Time	Contains values stored daily but at variable times.
AL	ALert Signal	Signals that data from a sensor should receive alert processing (used primarily by telemetry systems).

A data envelope begins with a BE record and ends with an EE record. An envelope contains information about the envelope (DE, MG, RE, and DB records) and one or more groups of station data. A data envelope structure is shown in the following example.

```
              - BE
              |   DB
              |   DE (OPTIONAL)
              |   MG (OPTIONAL)
              |   RE (OPTIONAL)
   Data       |   SD {FIRST SET OF STATION DATA}
              | ...
 Envelope     |   SD {SECOND SET OF STATION DATA}
              | ...
              | ...
              |   SD {LAST SET OF STATION DATA}
              | ...
              - EE
```

A group of station data begins with an SD record and ends with either another SD record or the EE record. Each group of station data consists of one or more groups of sensor data. A station data group structure is shown in the following example.

```
              - SD
              |  SE {FIRST SET OF SENSOR DATA}
              |  ...
    Station   |  SE {SECOND SET OF SENSOR DATA}
              |  ...
     Data     |  ...
              |  SE {LAST SET OF SENSOR DATA}
              |  ...
              - SD or EE
```

A group of sensor data begins with an SE record and ends with either another SE record, an SD record, or an EE record. Each group of sensor data must have a TM record to define the date and/or time of that group of data. For fixed interval data (UF and DF records), the TM record defines the date and time of the beginning time of the first data value on the next data record. Thus, any time there is a missing value, a new TM record must be included. For variable interval data (UV, UA, AND DV records), the TM record defines the date of the data on the following data records. Thus, a TM record must appear whenever the date changes. A sensor data group structure is shown in the following example.

```
              - SE
              |  TM
              |  UF or UV or UA or DV or DF
              |  ...
              |  UF or UV or UA or DV or DF
    Sensor    |  ...
              |  TM
     Data     |  UF or UV or UA or DV or DF
              |  ...
              |  UF or UV or UA or DV or DF
              |  ...
              |
              |  AL (OPTIONAL)
              - SE or EE
```

RULES:

1. Each envelope must contain data obtained from one recording instrument only.

2. A SD record must preceed a SE record.

3. A SE record must preceed a TM record.

4. After an SE record has been encountered, the data records (UF, UV, UA, DF, or DV) must not change type befor the next SE record is encountered. (E.g., A UV record must be followed by another UV record and not a UF, UA, DF, or DV record until the next SE record.) The data record type may be changed after supplying a new SE record.

5. If telemetry data are to be processed by an alert routine, an AL (alert) record must FOLLOW the sensor data for which that AL record is associated.

Several examples of data envelope record streams are presented below.

Data Formatted in the Standard Format:

```
BE  STDEDL
DB   7
SD  USGS 02191500
SE     1STAGE       65    11 72F010000
TM 19861203010000
UF   08    8.16    8.05    7.93    7.82    7.70    7.59    7.48    7.35
UF   08    7.03    6.94    6.85    6.76    6.70    6.64    6.58    6.53
UF   04    6.41    6.38    6.36    6.33
SE     2DO          400    11 70F030000
TM 19861203010000
UF    24C   2176
EE
```

Data From a DCP Being Transferred to QVARSA Unconverted:

```
BE DCPDCP
DE QVARSA
   DUR-CK 16CBC09A 86/338 0?15?20 5/129 20 0 +46.6 –06.6 –238 +17.4 21

   D@@UG@_]@Xm@vl@W\sLL
   &
EE
```

B.1   Record Types for the Transmission Envelope

Record Type: BE   Description: Beginning of Envelope

```
 Columns   Length    Description
 -------   ------    -------------------------------------------
 1 - 2      2        Record Type = BE.
   3        1        BLANK.
 4 - 6      3        Type of Message.

                        SCF - Site configuration information.
                        DCF - Device configuration information.
                        STD - Message in standard format.
                       RAW - Raw data along with conversion information.
                        EU  - DRGS engineering units format.
                        DCP - Unconverted DCP message.

 7 - 9      3        Data Source Type.

                        ADR  - 16-channel paper tape recorder.
                        ARC  - Unit values archived from ADAPS.
                        CHA  - Stripchart.
                        DCP  - Data collection platform.
                        EDL  - Electronic data logger.
                        OBS  - Observer.
                        RAD  - Radio telemetry.
                        TEL  - Dial-up telephone telemetry.
```

Record Type: DB   Description: Data-Base Number
                        (Must be supplied for DCP data, otherwise optional.)

```
 Columns   Length    Description
 -------   ------    ------------------------------------------
 1 - 2      2        Record Type = DB.
   3        1        BLANK.
 4 - 5      2        Data-Base Number used by ADAPS for
                     data-base identification.
```

Record Type: DE   Description: Destination

```
  Columns    Length    Description
  -------    ------    ----------------------------------------
  1 - 2        2       Record Type = DE.
    3          1       BLANK.
  4 - 39      36       Destination nodes.

                       Up to six 6-character nodes used to
                       distribute data in this envelope.
```

Record Type: MG   Description: Message

```
  Columns    Length    Description
  -------    ------    ----------------------------------------
  1 - 2        2       Record Type = MG.
    3          1       BLANK.
  4 - 80      77       Message to be sent to operational contact
                       (used in telemetry systems to report
                       problems or system status).
```

Record Type: RE   Description: REMARK

```
  Columns    Length    Description
  -------    ------    ----------------------------------------
  1 - 2        2       Record Type = RE.
    3          1       BLANK.
  4 - 80      77       Remarks about the data that should be
                       archived with the data.
```

Record Type: EE   Description: End of Envelope

```
  Columns    Length    Description
  ---------  --------  ----------------------------------------
  1 - 2        2       Record Type = EE.
```

B.2   Record Types for the Standard Data Format

Record Type: SD   Description: Station Data

```
 Columns   Length    Description
 ------    ------    ---------------------------------------
  1 - 2       2      Record Type = SD.
    3         3      BLANK.
  4 - 8       5      Agency.
  9 - 23     15      Station number.
 24 - 26      3      UTC offset used.
 27 - 27      1      Daylight savings flag.

                       'Y' - recording times converted to daylight
                             savings time for this station.
```

Record Type: SE   Description: Sensor

```
 Columns   Length    Description
 -------   ------    ---------------------------------------
  1 - 2       2      Record Type = SE.
    3         1      BLANK.
  4 - 7       4      Data Descriptor Number
                        Connects this sensor with a data
                        descriptor record in ADAPS.
  8 - 15      8      Sensor Name.
 16 - 20      5      Parameter code.
 21 - 25      5      Statistic code.
 26 - 27      2      Length of data field.
 28 - 28      1      Precision of data.
   29         1      Recording mode.
                       F - Fixed interval recording.
                       V - Variable interval recording.
 30 - 35      6      Recording interval of this sensor
                        (Used when RMODE = 'F') in the format HHHMMSS
                        where:

                        HH - Hours   (Range: 0-24)
                        MM - Minutes (Range: 0-59)
                        SS - Seconds (Range: 0-59)

                     (At least one of these field must be greater than zero.)
   37         1       Unit-values type code for unit-values archival,
                        where C = computed or E = edited.
```

Record Type: TM   Description: Date-Time Record

```
Columns    Length    Description
-------    ------    ---------------------------------------
 1 - 2       2       Record Type = TM.
   3         1       BLANK.
 4 - 11      8       Date of first value in the format YYYYMMDD
                     where:

                        YYYY - Year
                        MM   - Month
                        DD   - Day

12 - 17      6       Time of first recording in the format HHMMSS
                     where:

                        HH - Hour
                        MM - Minute
                        SS - Second

  18         1       Unit-Values finalization flag where:

                        F = Unit values for this date are finalized,
                            otherwise blank
                     (used only for unit-values archive records).
```

Record Type: UF   Description: Unit Values - Fixed Interval

```
Columns    Length    Description
--------   ------    -----------------------------------------
 1 - 2       2       Record Type = UF.
   3         1       BLANK.
 4 - 6       3       Number of unit values in this record.
                     For uncompressed data, must be less than
                     or equal to 124 / field length.
                     For compressed data, must be less than 1000.
   7         1       Compression flag.

                        'C' indicates that this record contains
                            1 value that represents the number
                            of values specified in columns 4-7.

 8 -132     125      Unit values with length of each value determined by
                     the length specified in sensor record.
```

<u>Record Type</u>: UV   <u>Description</u>: Unit Values - Variable Interval

```
  Columns    Length    Description
  --------   ------    ------------------------------------------
   1 - 2       2       Record Type = UV.
     3         1       BLANK.
   4 - 6       3       Number of unit values in this record.
   7 - 132    126      Unit Values repeated the number of times specified
                       in columns 4-6 in the format HHMMSSDDDD...D
                       where:

                         HH        - Hour value was recorded.
                         MM        - Minute value was recorded.
                         SS        - Second value was recorded.
                         DDDD...D - Unit value whose length is specified
                                    in the associated SE record.
```

<u>Record Type</u>: UA   <u>Description</u>: Unit Values -- Variable Interval (Archive)

```
  Columns    Length    Description
  -------    ------    ------------------------------------------
   1 - 2       2       Record Type = UA.
     3         1       BLANK.
   4 - 6       3       Number of unit values in this record.
   7 - 132    126      Unit Values repeated the number of times specified
                       in columns 4-6 in the format HHMMSSDDDD...DXYZZZ...ZB
                       where:

                         HH        - Hour value was recorded.
                         MM        - Minute value was recorded.
                         SS        - Second value was recorded.
                         DDDD...D - Unit value whose length is specified
                                    in the associated SE record.
                         X         - Write protect code.
                         Y         - Rounding code.
                         ZZZ...Z  - UV source and screening codes.
                         B         - Blank space indicating end of
                                     codes.
```

<u>Record Type</u>: DF   **<u>Description</u>: Daily Values -- Fixed Interval**

```
 Columns    Length    Description
 -------    ------    -----------------------------------------
 1 - 2       2        Record Type = DF.
   3         1        BLANK.
 4 - 6       3        Number of daily values in this record.
                      For uncompressed data, must be less than
                      or equal to 124 / column length.
                      For compressed data, must be less than 1000.
   7         1        Compression flag.

                         'C' indicates that this record contains
                             1 value that represents the number
                             of values specified in columns 4-6.

 8 -132     125       Daily values with length of each value
                      determined by the length specified in
                      sensor record.
```

<u>Record Type</u>: DV   **<u>Description</u>: Daily Values -- Variable Interval**

```
 Columns    Length    Description
 -------    ------    -----------------------------------------
 1 - 2       2        Record Type = DV.
   3         1        BLANK.
 4 - 6       3        Number of daily values in this record.
 7 - 132    126       Daily Values repeated the number of times
                      specified in columns 4-6 in the format
                      YYYYMMDDHHMMSSDDDD...D where:

                        YYYY     - Year value was recorded.
                        MM       - Month value was recorded.
                        DD       - Day value was recorded.
                        HH       - Hour value was recorded.
                        MM       - Minute value was recorded.
                        SS       - Second value was recorded.
                        DDDD...D - Daily value whose length is
                                   specified in the associated
                                   SE record.
```

Record Type: AL   Description: Alert -- Identifies Data to be Processed for Alert Conditions.

```
Columns    Length    Description
-------    ------    ---------------------------------------
 1 - 2       2       Record Type = AL.
   3         1       BLANK.
 4 - 5       2       Alert number - identifies ADAPS alert routine to
                                    invoke.
 6 - 37      32      User id      - user-identifier to notify when an
                                    alert condition is detected.
```